Kalaupapa National Historical Park

National Park Service
U.S. Department of the Interior

Environmental Assessment
Solid Waste Management
Kalaupapa National Historical Park
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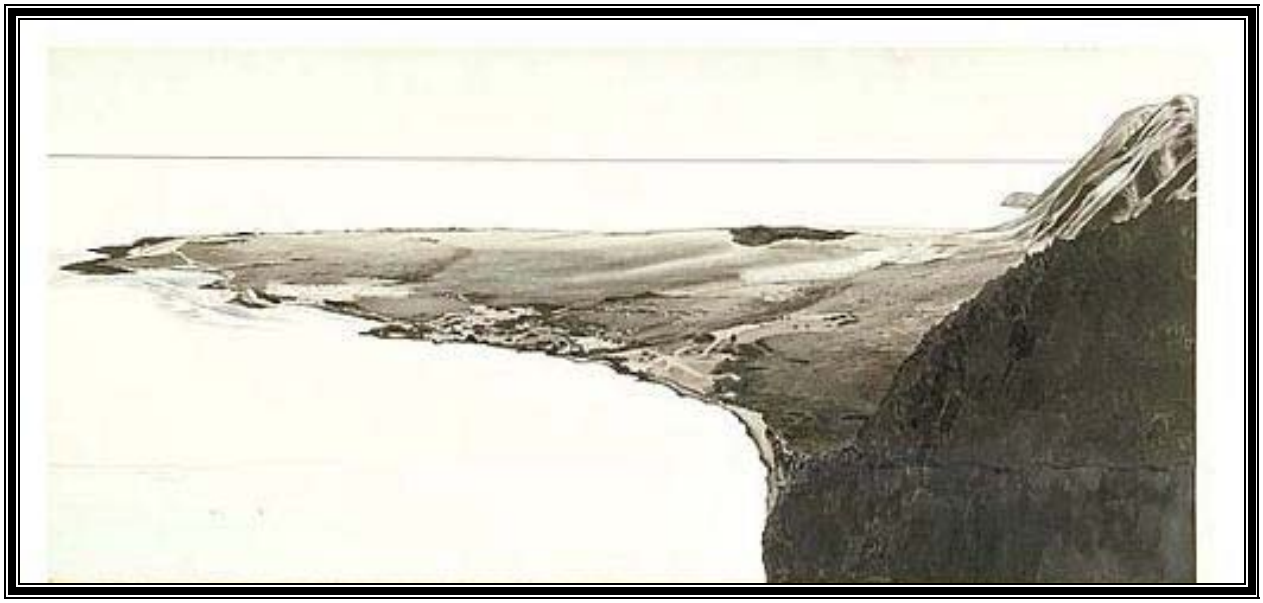

The Kalaupapa Peninsula

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICIES

CHAPTER 1: PURPOSE AND NEED

Background

Kalaupapa National Historical Park (NHP) is located in an isolated setting midway along the north shore of the island of Moloka`i in the State of Hawai`i (Figure 1). Kalaupapa, the Hawaiian place name, is interpreted as "a flat leaf" and the peninsula is a comparatively flat plateau of lava about 2¼ miles wide, projecting out from a 2,000 foot cliff. The peninsula was formed by a small volcano, arising from Kauhakō Crater, adjacent to the larger volcanoes that form Moloka`i. Kalaupapa NHP is unique among units of the NPS system because there is an active community of Hansen's Disease patients living within the park. The residential area of the Kalaupapa Settlement is located on the western side of the peninsula and includes residences, dormitories, a hospital, post office, dining hall, a firehouse, a small grocery store, gas station, a social hall, maintenance and storage buildings, churches and the attendant infrastructure needed to support a small and isolated community (Figure 2).

Kalaupapa, also commonly referred to as “Kalaupapa Leprosy Settlement,” “Kalaupapa Peninsula,” “Kalaupapa Settlement” or “Kalawao County” was established in 1980 by Public Law 96-565 “to provide for the preservation of the unique nationally and internationally significant cultural, historic, educational, and scenic resources of the Kalaupapa Settlement on the island of Moloka`i.” The establishment of the park followed designation of Kalaupapa Settlement as a National Historic Landmark District in 1976. The goal is to protect the lifestyle and individual privacy of the Hansen's disease patients who are residents there. Although the primary resource management emphasis at Kalaupapa is cultural preservation and education, NPS resource management objectives also recognize the Park's inherent scenic, geologic, biotic and archeological resources, including National Natural Landmark designation for 27,000 acres of the North Shore Cliffs.

The mission of National Park managers is to conserve natural and cultural resources and to provide for enjoyment by all visitors. The principal purposes of Kalaupapa are to:

- Preserve and interpret the Kalaupapa Settlement for the education and inspiration of present and future generations
- Provide a well-maintained community in which the Kalaupapa Hansen’s Disease patients are guaranteed that they may remain at Kalaupapa as long as they wish, to protect the current lifestyle of the patients and their individual privacy, to research, preserve, and maintain important historic structures, traditional Hawaiian sites, cultural values, and natural features; and to provide limited visitation by the general public
- Provide that the preservation and interpretation of the Settlement be managed and performed by patients and native Hawaiians to the extent practical, and that training opportunities be provided such persons in management and interpretation of the Settlement’s cultural, historic, educational, and scenic resources

Kalaupapa NHP includes approximately 10,726 acres within the authorized boundary including about 8,726 acres of land and about 2,000 acres of offshore area. The authorized boundary of Kalaupapa NHP includes the Kalaupapa Peninsula, Kukaiwàa and Nihoa (two land shelves on the east and west boundaries of the park respectively), three narrow valleys deeply eroded into the original shield volcano of east Moloka`i, adjacent cliffs, and the offshore waters extending ¼ of a mile out and around the peninsula. The three valleys are called Waikolu, Wai`ale`ia and Waihānau and are bordered on three sides by 1,600 to 3,000 foot cliffs. The boundary extends offshore for ¼-mile from high tide line and encompasses the islets of Huelo and Ōkala. In addition, the

boundary includes a strip of land along the top of the cliff from Pala`au to Waihānau, and a portion of Pala`au State Park.

The National Park Service (NPS) has limited land ownership within the authorized boundary of Kalaupapa NHP, and is therefore directed in the park's enabling legislation to operate and manage through "cooperative agreements with the owner or owners of property within the park. . ." The NPS has entered into long-term agreements with the State of Hawai`i's Department of Health (DOH), Department of Land and Natural Resources (DLNR), Department of Hawaiian Home Lands (DHHL), and Department of Transportation (DOT). NPS lands within the authorized boundary consist of about 22 acres of former U.S. Coast Guard land transferred to the NPS in 1981. The NPS leases 1,247 acres from DHHL, who owns the lands that comprise primarily all of the Kalaupapa Settlement proper or residential area. The 50-year lease expires in 2041 and includes compensation for the DHHL. The federal Department of Transportation (DOT) owns the airport grounds and provides for ongoing operational needs at that location. The DLNR, owning a significant portion of the lands on the peninsula including the adjacent valleys, also has regulatory authority over Conservation District lands, including the Puu Ali`i Natural Area Reserve, and the offshore waters. By State law (Chapter 326, Hawai`i Revised Statutes) and on behalf of the other state agencies listed above, DOH maintains residential jurisdiction over nearly all of Kalaupapa NHP, controls public access, and owns and is responsible for maintaining settlement buildings, utilities and roads. DOH's Hansen's Disease Branch (HDB) is directly responsible for providing health care services for the patients at Kalaupapa.

The NPS also has cooperative agreements with the Roman Catholic Church in Hawai`i and the Hawai`i Conference Foundation, owners of historic churches within the park. There are about 72 acres of private lands within the authorized boundary located along the top of the cliffs. Kalaupapa NHP has the authority to acquire private land by donation, purchase or exchange.

Purpose and Need

The purpose and need for this project stems from a cooperative agreement between the DOH and NPS (CA8896-4-0001, March 7, 1984, renewed on April 1, 2004) that calls for the transfer "in an orderly manner the duties and functions" of the DOH to the NPS, which includes solid waste operations at Kalaupapa. DOH has received decreasing amounts of financial support from both state and federal sources. Increasing demands for limited public funds elsewhere have forced DOH to cut back at Kalaupapa. Under the enabling Act, the NPS is to provide a well-maintained community and is to preserve and protect the many historic buildings and structures within the park. In keeping with the legislative purpose the NPS has been incrementally taking on responsibilities for the operation and management of the settlement. This project presents the NPS's alternatives for the managing of solid waste at Kalaupapa.

Kalaupapa is in a difficult environment for solid waste management. There are numerous challenges to implementing an effective solid waste program including the remote location, the tropical climate, and the lack of staff resources. Kalaupapa NHP is isolated from the rest of Moloka`i and no roads exist to connect it with other parts of the island. Kalaupapa personnel have been performing to the best of their abilities with the resources available and have come up with a system that works but is not preferable for the long term.

Kalaupapa needs improved solid waste management. Currently, about 79 percent of solid waste is disposed of on –site in two landfills and the remaining 21 percent is shipped out annually for

recycling. These processes, along with past practices, have led to some degradation of the historic resources, natural resources, and visitor experience. The current landfill operation, managed by the DOH, is at capacity, and is proposed for closure in 2008. In an October 2002 letter the DOH and the NPS formally agreed that the NPS would assume future responsibility for the management of solid waste at Kalaupapa. Under the agreement, the HDB will continue to operate their existing landfill until the NPS is ready to begin the operation of new replacement facilities. Change is needed to bring the solid waste operation under control and bring more organization to the process.

The purpose of the project is to improve the handling and disposal of solid waste at Kalaupapa NHP, including developing and encouraging appropriate alternatives to the landfills such as recycling and composting. The goal is an integrated solid waste management system that results in minimal impacts to the land, water, and people of Kalaupapa. The desired future condition is for a community that:

- Generates a minimal amount of solid waste requiring disposal
- Composts and recycles the maximum amount of solid waste
- Implements the least impacting solution for disposal of waste that cannot be recycled or composted

The purpose of this environmental assessment is to evaluate the environmental impacts of the feasible, environmentally sound and cost effective alternative solutions for the disposal of solid waste generated at Kalaupapa and to allow for public participation in the decision-making process. Additionally, the purpose of this EA is to develop acceptable and effective measures to mitigate or prevent the adverse impacts, if any, of the proposed solid waste management operations on natural and cultural resources and the visitor experience. This environmental assessment has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) and regulations of the Council on Environmental Quality (40 Code of Federal Regulations (CFR) 1508.9); National Park Service Director's Order – 12: Conservation Planning, Environmental Impact Analysis, and Decision-making and Section 106 of the National Historic Preservation Act of 1969 (as amended) (36 CFR Part 800 Section 800.0(c) [Use of the NEPA process for Section 106 purposes]).

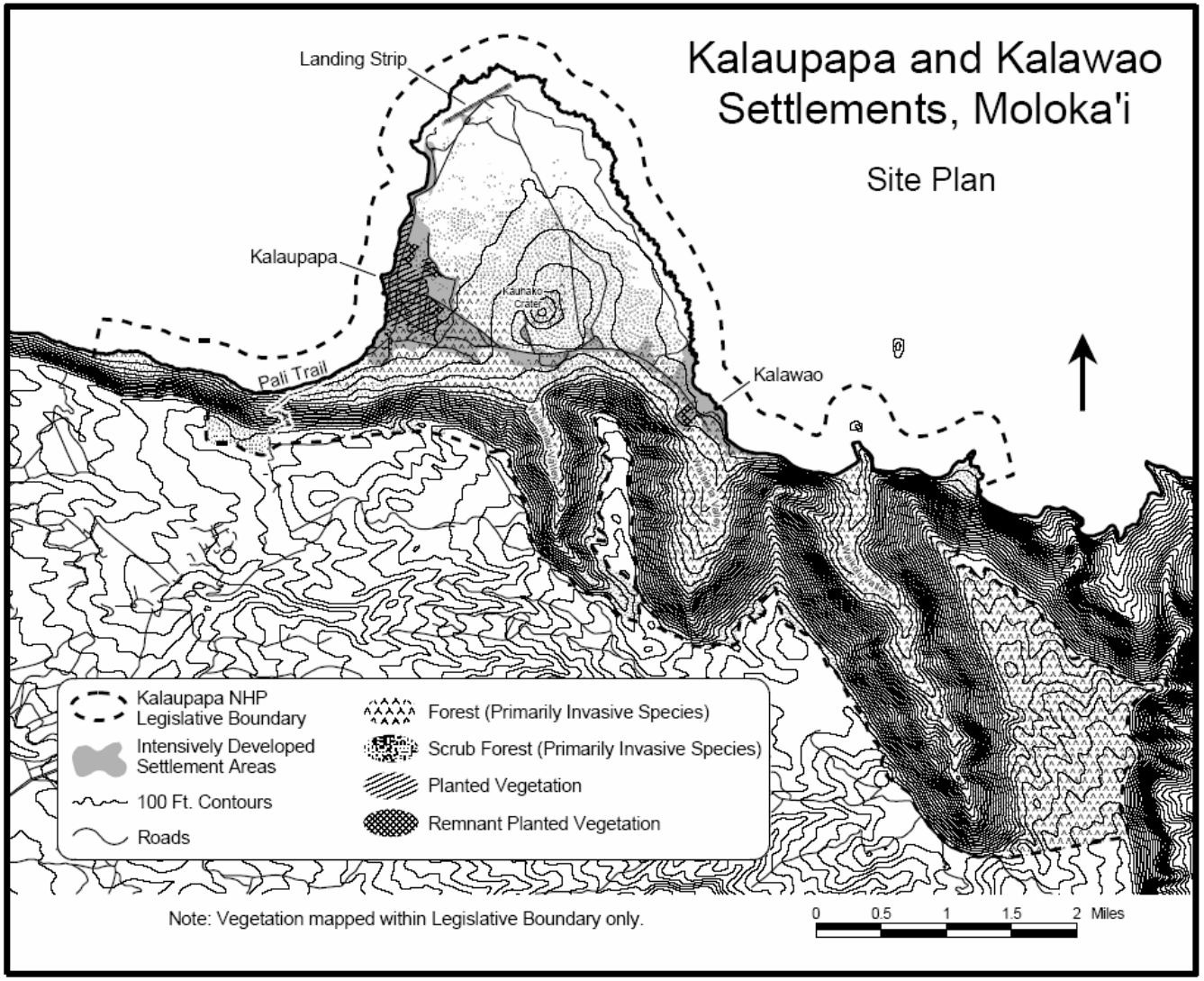

Figure 1: Site Location Map

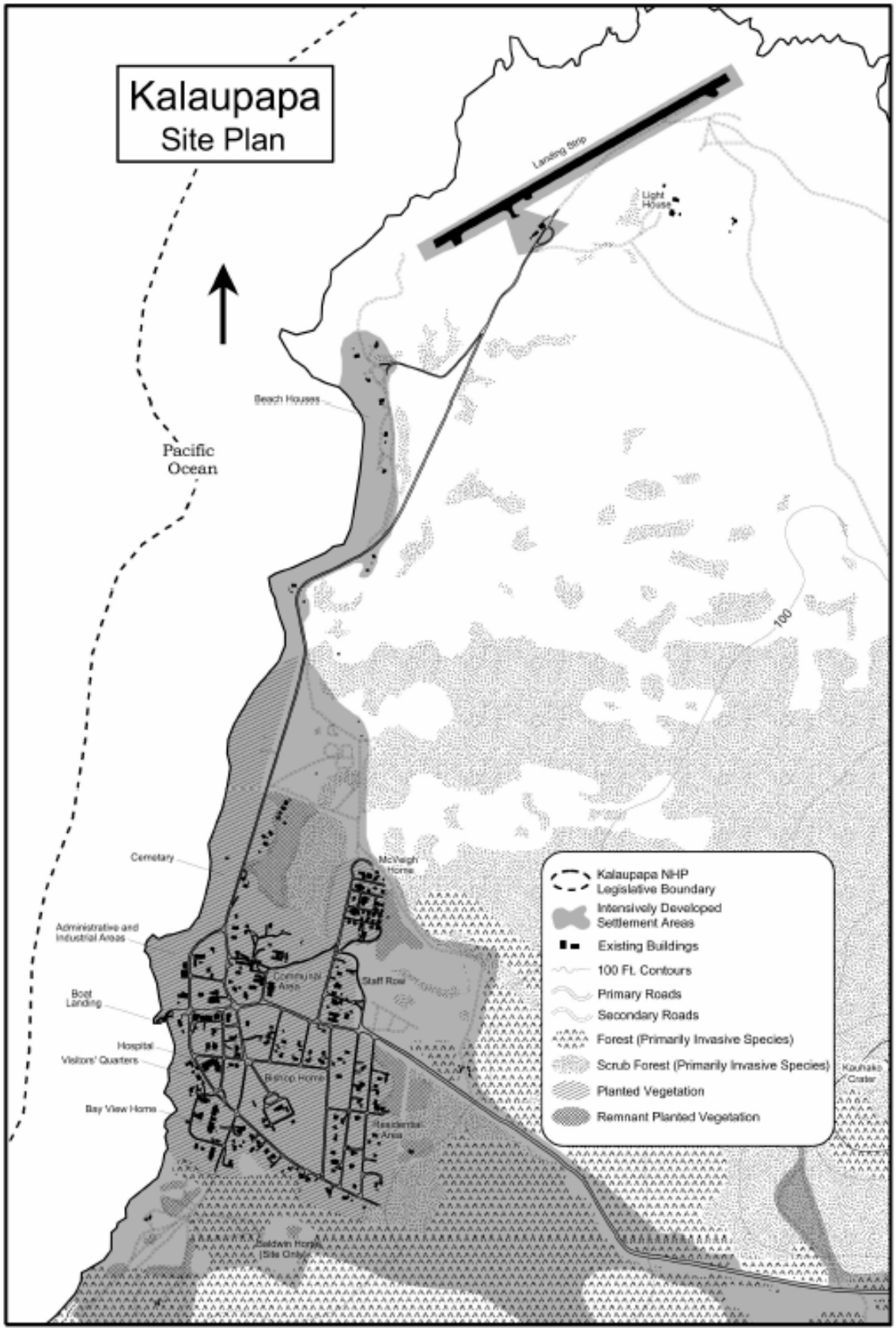

Figure 2: Kalaupapa Site Plan

CHAPTER 2: WASTE GENERATION, CURRENT PRACTICES, AND MANAGEMENT CONSTRAINTS

It is estimated that the community at Kalaupapa currently generates approximately 72 tons per year of municipal solid waste (MSW). Table 1 summarizes the composition of wastes generated, the source, current waste management practices, and estimated quantities of waste diverted from the landfills. The quantities listed in the table do not total to the estimated 72 tons per year because the amount of several materials, including construction and demolition waste, tires, and medical waste, for example, are unknown due to lack of records or other methods from which quantities could reliably be estimated.

MSW collection is conducted by DOH staff. Trash is picked up from private residences once per week and twice per week from the dining hall, store, NPS and DOH administrative offices, post office, general maintenance area, slaughterhouse, fire department, dormitories, the recreation center, the airport, and the church. Residents purchase their own household and office collection containers. No other dumpsters or containers are used in the community other than reused 55-gallon drums. The collection operation is currently staffed by one DOH employee who spends approximately 12 hours per week collecting and disposing the wastes. Trash collection is conducted using a 2.5-ton dump truck and a 3/4-ton pickup truck owned, serviced and maintained by the DOH. These two trucks are used for a variety of services and are not dedicated to trash collection.

Table 1: Waste Generation and Current Management Practices

Waste Stream	Source	Quantity tons/ year[1]	Current Management Practice
Waste Disposed in the Kalaupapa Landfills			
Household and Commercial Trash	Daily trash generated by residents and staff	5.89	Collected bi-weekly Disposed into Household Waste Landfill
Newspaper (Delivered daily)	About seven papers delivered daily	0.95	Disposed as MSW
White and mixed paper	Administrative offices (DOH and NPS), dining hall, and care center	5.38	Disposed as MSW
Corrugated cardboard	Delivery of supplies and materials to residents, the care center, the store and the offices.	3.08	Disposed as MSW
Glass	From the dining hall, residences, administrative offices, and other areas	3.43	Disposed as MSW
Steel (tin) and bi-metal cans	Limited fresh food delivered by plane, the community relies largely on canned food	1.35	Disposed as MSW
Plastic	From the residences, dining hall, care center, and other facilities	0.72	Disposed as MSW
Other “dry” commercial/construction wastes	From on-going historic preservation work and other construction	Unknown	Disposed as MSW or containerized and barged off-site

Waste Stream	Source	Quantity tons/ year[1]	Current Management Practice
Food waste	From the dining hall, pre-consumer waste (food preparation scraps and cooking waste) and post-consumer waste (plate scrapings)	6.1	Food waste left for feral pigs
Vegetative waste	From landscaping, tree falls, and cleared brush.	6.25	Commercial waste landfill
Aluminum cans	Generated from visitor lunches, residents, and staff	0.148	Recycled via ocean barge at Reynolds Aluminum
Scrap metal	Includes about 20-25 white goods, such as appliances, equipment, and automobiles (about 10 to 20).	Unknown	Recycled via ocean barge at Hawai`i Metals in Honolulu
Tires	Estimates up to 150 tires are discarded each year some reused onsite.	Unknown	Stockpiled, reused, or shipped out on barge
Game waste	Hunting of feral pigs and deer.	Average 76 carcasses per year	Disposed in designated pit
Mule Manure	Mule ride concessionaire (about 20 mules on guided tours 6 days per week).	21.7	Left in place; some used as soil amendment
Hazardous waste	Waste oil and mixed fuel waste.	(4) 55-gallon drums, 20 to 30 lead acid batteries	Properly shipped off-island

[1]Waste volumes were estimated based on visual observations during site visits, staff interviews, and review of available records. Tonnage estimates were then calculated using volume to weight conversion factors provided in the NPS Solid Waste Management Handbook.

Primarily, solid waste is disposed of in one of two landfills called the "household waste landfill" and the "commercial waste landfill". These landfills are located adjacent to one another and are operated by the DOH on DHHL lands approximately 1,000 feet from the Settlement (Figure 3).

The household waste landfill is an above-grade fill located on a 1.5 acre site near the base of the Pali Trail. DOH has operated the landfill since the early 1980s and as the initial trenches were filled and space for additional trenches is limited, additional lifts have been added above the trench fills. Currently, the upper surface of the landfill is 6 to 12 feet above the level of the adjacent ground. The landfill does not have a liner system, monitoring system for landfill gas, or groundwater monitoring wells. The amount of cover material and regularity of its application appear to be somewhat haphazard as solid waste occasionally is found lying around in plastic wrapping. Because there is no more soil onsite, soils are excavated from the trenches at the commercial waste landfill and hauled to the site. Large amounts of soil are currently being required due to the need to cover the above grade refuse. Surface water run-on/runoff has been diverted away from the existing refuse areas. A cattle guard has been installed to limit entry by

feral pigs. The landfill is located a short distance from the mule corral where visitors are picked up for a tour of Kalaupapa and wind-blown paper and other trash often end up where visitors are waiting. Trees that are adjacent to the landfill currently serve as a windbreak against the prevailing winds and collect wind-blown trash during major storm events. Collections result in approximately 800 pounds of MSW disposed in the landfill per week, for an estimated total of 20.8 tons disposed per year.

The commercial waste landfill is at a separate 6.5 acre site that was opened in the early-1990s. To date, 3 or 4 trenches have been excavated to depths of 8 to 12 feet and then filled with refuse. This landfill is located 100 to 300 feet south of Waihānau Stream, a stream with intermittent flow. Surface water run-on/runoff has been diverted away from the existing refuse areas. The landfill does not have a liner system, monitoring system for landfill gas, or groundwater monitoring wells. The site has not been fenced and could be expanded to the east and to provide up to 20 years of disposal capacity. Because records are not kept it is not possible to determine the quantity of wastes in the commercial landfill, however it is typically generated from commercial, construction, or demolition operations.

Adjacent to the commercial waste landfill, dead animals and offal are currently being disposed in 10 by 15 foot pits that are 8 to 12 feet deep. The Solid Waste Management Permit for the site requires the waste to be covered with 2 feet of soil and compacted at the end of each day. It is DOH policy to require hunters and other users to cover their animal remains each time they utilize the pit for disposal. This is a major source of odor and an attraction to vectors, including the feral pigs that travel between the game waste disposal pit and the pig slop feeding area.

The DOH has stated its intent to close down the landfills at Kalaupapa by 2008. The HDB received a consent decree (December 2, 2002) from the DOH's Solid and Hazardous Waste Branch (SHWB) that called for HDB to close the landfills and ensure post-closure care of solid waste facilities at Kalaupapa. HDB has prepared a plan that calls for the closure of the DOH landfills by 2008 and requires post-closure inspection, care and maintenance by the HDB for a period of up to 30 years.

As indicated in Table 1, some of the solid waste at Kalaupapa is diverted from the peninsula's landfills. This includes recycling aluminum cans, tires, scrap metal, the use of mule manure as soil amendment and diverting food waste. Aluminum cans are collected by the volunteer members of the Kalaupapa Lions Club. Revenue generated yearly ranging from $600 to $900 goes to support the club's local administrative and service-orientated activities. Wire mesh containers are located at various spots throughout the community for residents to drop off cans which are then transported on the ocean barge annually to Reynolds Aluminum in Honolulu. Access limitations, transportation costs, and the relatively small quantity of recyclable materials have not encouraged the development of additional recycling programs. Manure is piled at the mule stables and allowed to decompose with some portion mulched and used as soil amendment in gardening applications. Food waste from the dining hall is diverted and used as pig slop.

There are no formal waste prevention education programs or environmentally preferable purchasing guidelines in place at Kalaupapa. However, out of necessity, the community is self-sufficient and resourceful and the cost and effort to obtain supplies and dispose of materials is apparent among community members.

Constraints

Managing solid waste at Kalaupapa is challenging because of geographic, regulatory, jurisdiction and community constraints. Methods used in the past to dispose of solid waste are not acceptable

under current federal regulations and NPS policy. A comprehensive and cautious approach is required to balance need for solid waste management with the constraints.

Kalaupapa is located on the north shore of Moloka`i. The peninsula is surrounded by cliffs and the ocean. Most national parks truck waste out of the park to an approved landfill for disposal. There are no roads to Kalaupapa to transport solid waste. In other parks with similar geographic constraints, such as Channel Islands National Park in California, the NPS collects solid waste, transports it to the dock, and ships it off regularly. Because Kalaupapa is north facing, it is regularly pounded by large waves and strong tides, especially in winter, making regular boat service dangerous nine months of the year. The dock can accommodate shallow hulled vessels and barge service is available during the summer months only.

In addition to geographic constraints, regulatory constraints limit the alternatives for solid waste management in units of the NPS. Section 6.4 of 36 CFR Part 6 regulates the operation of solid waste disposal sites within units of the National Park System. Section 6.4 requires that new solid waste disposal sites are constructed and operated in a manner that will meet the following twelve criteria:

> No person may operate a solid waste disposal site within the boundaries of a National Park System unit that was not in operation on September 1, 1984, unless the operator has shown and the Regional Director finds that:
>
> (1) The solid waste is generated solely from National Park Service activities conducted within the boundaries of that unit of the National Park System;
>
> (2) There is no reasonable alternative site outside of the boundaries of the unit suitable for solid waste disposal;
>
> (3) The site will not degrade any of the natural or cultural resources of the unit;
>
> (4) The site meets all other applicable Federal, State and local laws and regulations, including permitting requirements;
>
> (5) The site conforms to all of the restrictions and criteria in 40 CFR 257.3-1 to 257.3-8, and 40 CFR part 258, subparts B, C, D, E and F;
>
> (6) The site will not be used for storage, handling, or disposal of a solid waste containing:
>
> i. Hazardous waste;
> ii. Municipal solid waste incinerator ash;
> iii. Lead-acid batteries;
> iv. Polychlorinated Biphenyls (PCBs) or a PCB item;
> v. A material registered as a pesticide by the Environmental Protection Agency under the Federal Insecticide, Fungicide Rodenticide Act (7 U.S.C. 136 *et seq*.);
> vi. Sludge from a waste treatment plant, septic system waste, or domestic sewage;
> vii. Petroleum, including used crankcase oil from a motor vehicle, or soil contaminated by such products;
> viii. Non-sterilized medical waste;
> ix. Radioactive materials; or
> x. Tires;

(7) The site is located wholly on nonfederal lands, except for NPS operated sites in units where nonfederal lands are unavailable or unsuitable and there is no practicable alternative;

(8) The site is not located within the 500-year floodplain, or in a wetland;

(9) The site is not located within one mile of a National Park Service visitor center, campground, ranger station, entrance station, or similar public use facility, or a residential area;

(10) The site will not be detectable by the public by sight, sound or odor from a scenic vista, a public use facility, a designated or proposed wilderness area, a site listed on, or eligible for listing on, the National Register of Historic Places, or a road designated as open to public travel;

(11) The site will receive less than five tons per day of solid waste, on an average yearly basis; and

(12) The proposed closure and post-closure care is sufficient to protect the resources of the National Park System from degradation.

The NPS Regional Director of the Pacific West Region must find that these twelve criteria are met before permitting a new solid waste disposal site. Landfills, incinerators, and transfer stations are considered solid waste disposal sites under NPS 36 CFR Part 6. Composting and recycling centers are not considered solid waste disposal sites and therefore not subject to 36 CFR Part 6 criteria.

NPS is also subject to regulations established by the Environmental Protection Agency (EPA) for solid waste disposal and treatment as promulgated in Resource Conservation and Recovery Act (RCRA), Subtitle D, 40 CFR 257 and 258; the Clean Air Act (40 CFR 60), and requirements of Hawai`i Administrative Rules governing solid waste (HAR 11-58) and air quality (HAR 11-60). In 1993, the State of Hawai`i adopted the requirements of RCRA Subtitle D and became an EPA approved state and the State Department of Health's Office of Solid Waste Management (DOH OSWM) assumed administration of the regulatory program. Within HAR 11-58, Solid Waste Management Control Regulations, there are seven location restrictions applicable to a new municipal solid waste landfill, and permit/design/operating requirements applicable to a solid waste incinerator. The DOH OSWM issues a series of Fact Sheets which compile interpretation of the requirements and best-management practices on the handling of certain wastes, such as construction/demolition debris, pressure-treated wood, etc. While not directly governing solid waste management, other programs within DOH can also impose certain restriction on the design/operation of a solid waste facility.

In addition to geographic and regulatory requirements, there are also jurisdictional constraints in place that restrict the future location of solid waste disposal facilities. These constraints result from Kalaupapa's enabling Act and NPS's limited ownership of approximately 20 acres of the more than 10,000 acres within the authorized boundary. The lease agreement between the DHHL and the NPS (General Lease 231, Article Two, paragraph 7) states the NPS "shall not at anytime during the term, construct, place, and install on the demised premises any building, structure or improvement of any kind and description whatsoever except with the prior written consent of the LESSOR."

In addition to the constraints imposed by the DHHL on their lands, those portions of Kalaupapa classified as Conservation District by the State Land Use Commission have very limited permitted uses. In general, the DLNR allows Conservation District lands to be used only for watershed protection, as habitat for native plants and wildlife, or to preserve historic and archeological areas or as beach reserves. The Pu'u Ali'i Natural Area Reserve, located in the park's eastern end, has even

more stringent use limitations. The construction of solid waste disposal facilities would not be a permitted use on Conservation District lands or within the Pu'u Ali'i Natural Area Reserve.

In addition, solid waste disposal facilities must not adversely impact the lifestyle of the remaining patients at Kalaupapa. Under the enabling Act, NPS is mandated to protect the current lifestyle of the patients and solid waste facilities that disrupt that lifestyle would run counter to the park's purpose.

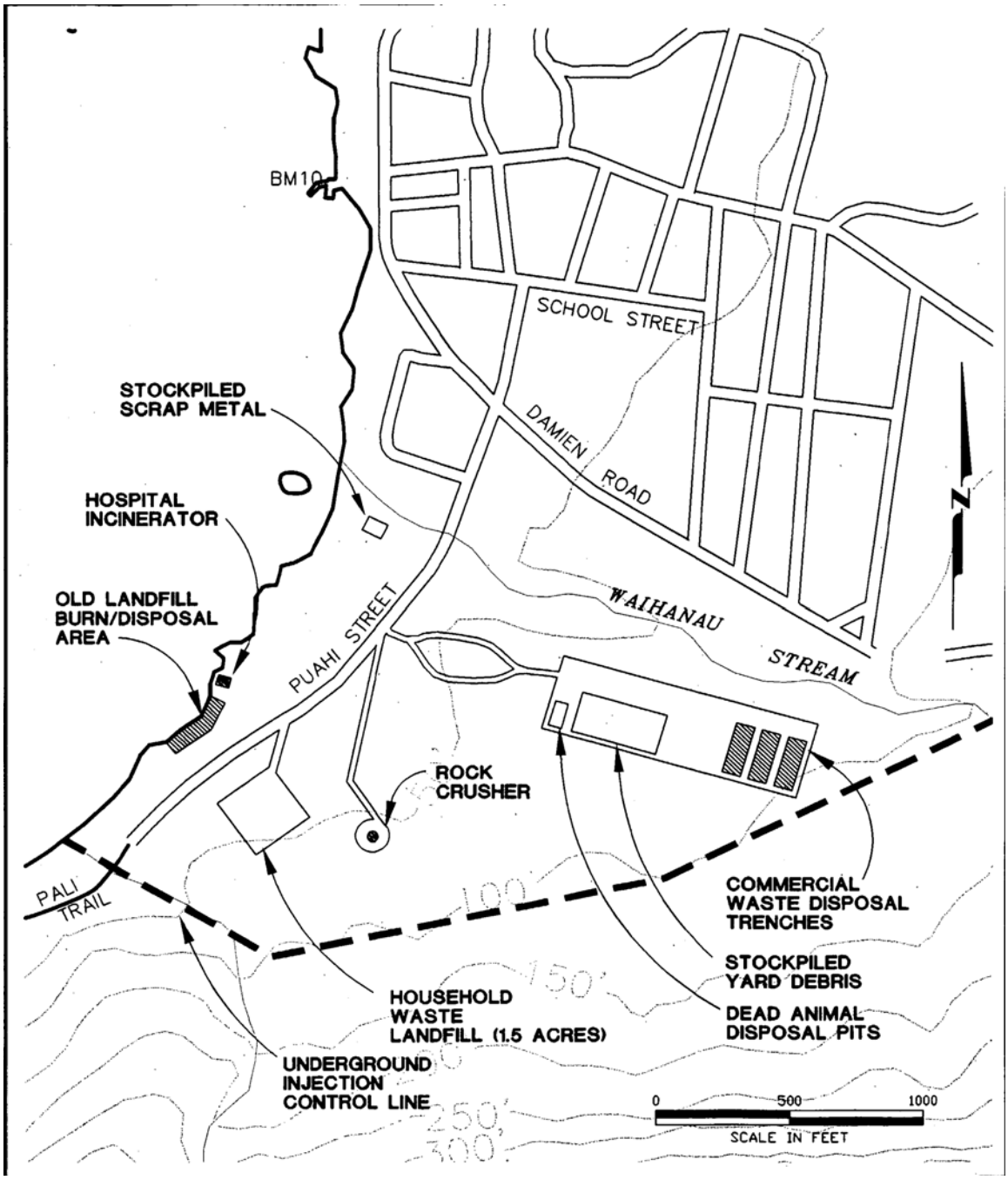

Figure 3: Existing Landfill Facilities

Household Waste Landfill

Household Waste Landfill

CHAPTER 3: ALTERNATIVES

This chapter identifies actions common to both action alternatives, two action alternatives to handle solid waste not composted or recycled, the no action alternative, and alternatives dismissed from further analysis. NPS will use the analysis in the EA along with input from individuals, organizations, and agencies to reach a final decision that will be presented in the Finding of No Significant Impact (FONSI) or the NPS will start preparation of an Environmental Impact Statement (EIS). Estimated costs in this chapter are presented in 2006 dollars.

Actions Common to Both the Action Alternatives

Recycling Program and Recycling Facility

The proposed recycling program would encourage current recycling efforts and expand the program to include the collection of glass and plastic bottles, steel cans, and cardboard and paper from public areas, visitor facilities, housing areas, concession operations, and park administration and maintenance facilities. Different color bins would be provided to indicate how to sort the recyclable materials that would be collected and delivered to a recycling center for sorting and processing.

The recycling center is proposed to be housed within the Settlement at Building 259A and would provide shelter for the recycling processing equipment, for materials delivered to the facility, and for workers operating the recycling equipment (Figure 4). The building would protect and lengthen the operating life of the processing equipment and enclose recycled materials, preventing litter, odor, and environmental degradation of the materials. The building will house processing equipment including a baler and sorting conveyors with vehicle traffic inside the building, including forklift traffic. Operation of the recycling facility includes the following functions:

- Receiving the collected recycled materials and solid waste from collection vehicles.
- Sorting of recycled materials to separate specific types or grades for processing and removing contaminant materials, such as cleaners or aerosols.
- Sorting of trash for off-site disposal
- Processing materials for storage and shipment to recycled materials markets, including baling cardboard and paper grades, baling aluminum cans and steel cans, baling plastic bottles, and crushing glass.
- Storage of sorted materials in separate grades prior to processing.
- Storage of processed materials awaiting transportation to local reuse or to recycling markets in Honolulu.
- Storage of some quantity of unsorted, unprocessed recycled materials.

Storage of recycled materials awaiting transportation to local reuse or to recycling markets would occur outside of the processing facility in two to three 20-foot cargo containers located outside of Building 259A. Bales could be stored temporarily in available space inside the building, or transported directly into cargo containers for storage until shipping via barge to recycling markets in Honolulu.

Building 259A will be retrofitted to accommodate the recycling program. The building currently has solid walls on three sides, a roof and a dirt/gravel floor. Planned modifications to the

building include raising the roof on one portion of the building and paving the entire floor area. Additional screening and wind barriers could be added to the open wall of the building in support of the solid waste processing activity. A septic system and leach field will be installed outside the building. In addition, two new overhead electrical poles would be installed to bring electricity to operate the recycling machinery.

Capital costs to implement a recycling program at Kalaupapa have been estimated at $114,000 for equipment purchase and installation and $360,000 for building improvement. The total annual operating costs (labor, equipment, utilities, etc.) are estimated to be about $26,000. The annual operating costs would be offset by an estimated $3,500 in expected annual revenue from recycling.

Composting Program and Facility

Collected compostable materials would be delivered to a newly constructed composting facility. NPS evaluated four methods of composting and is proposing in-vessel composting because it permits maximum control over composting process and quality, provides odor control and protection from animals, and is relatively easy to operate and maintain. Small-scale in-vessel composting technology uses a stationary enclosure as the composting vessel, with manual or automatic controls for moisture, aeration and temperature. The containers are fully enclosed, rodent and bird resistant, and the leachate would be collected and treated as part of the system. The unit would be installed on a concrete pad and covered over with a roof and electrical power would be needed to run the automatic controls. The size of the pad area for the composting area would be approximately 10,000 square feet or about 0.3 acres of land and minimal excavation would be needed.

The composting program would include food waste, mule manure, green waste, animal carcasses, and brush. Food waste and mule manure would be loaded directly into the composting system. Composting food waste would end the practice of feeding food waste to the feral pig population. Yard, wood, and green waste would be chipped before being added to the composting vessel. Upon completion of the composting process, the materials would be removed and stored in static piles to cure, or finish, until ready for application to grassy and landscaped areas in the park.

The proposed location for the composting facility is Site E (Figure 5) because it is the least impacting site to the community and resources. Site E is outside and downwind of the residential area resulting in little potential for odors affecting the community. The site would be fairly hidden by the vegetation and topography. Site E is located on disturbed soil because the site was previously bulldozed and cleared of vegetation. An archeological survey indicated that Site E is void of intact archeological resources (McCoy *et al* 2005). In addition, the NPS would not be introducing a new land use because Site E is located adjacent to the existing landfill. There is an existing dirt road to Site E, reducing road construction costs and impacts. Site E is outside of the identified tsunami inundation zone and is about a two-mile distance from the airport runway. Total capital costs for the composting operation at Site E is estimated to be $352,000 and annual operating cost is estimated to be $111,000.

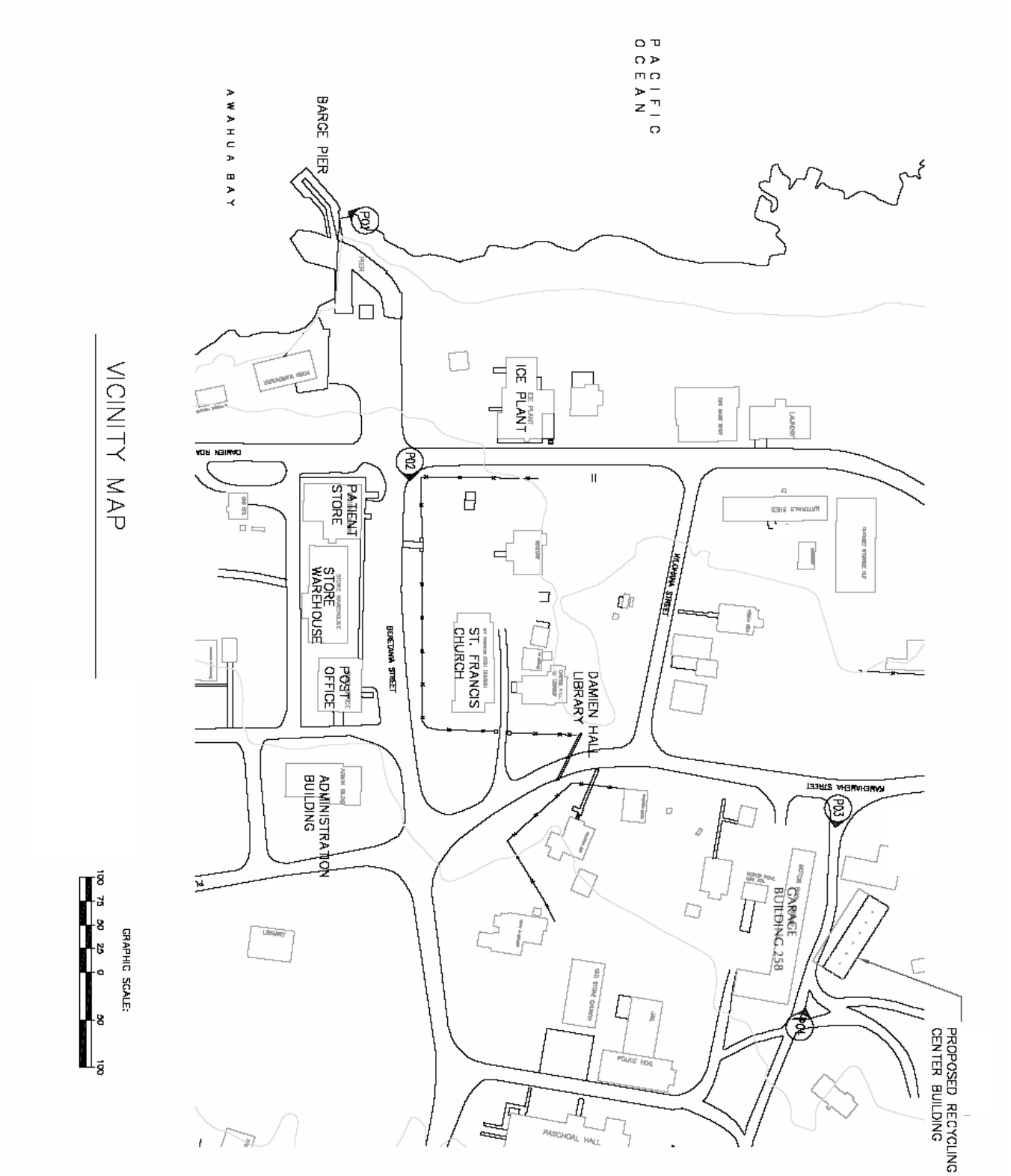

Figure 4: Building 259A Recycling Center

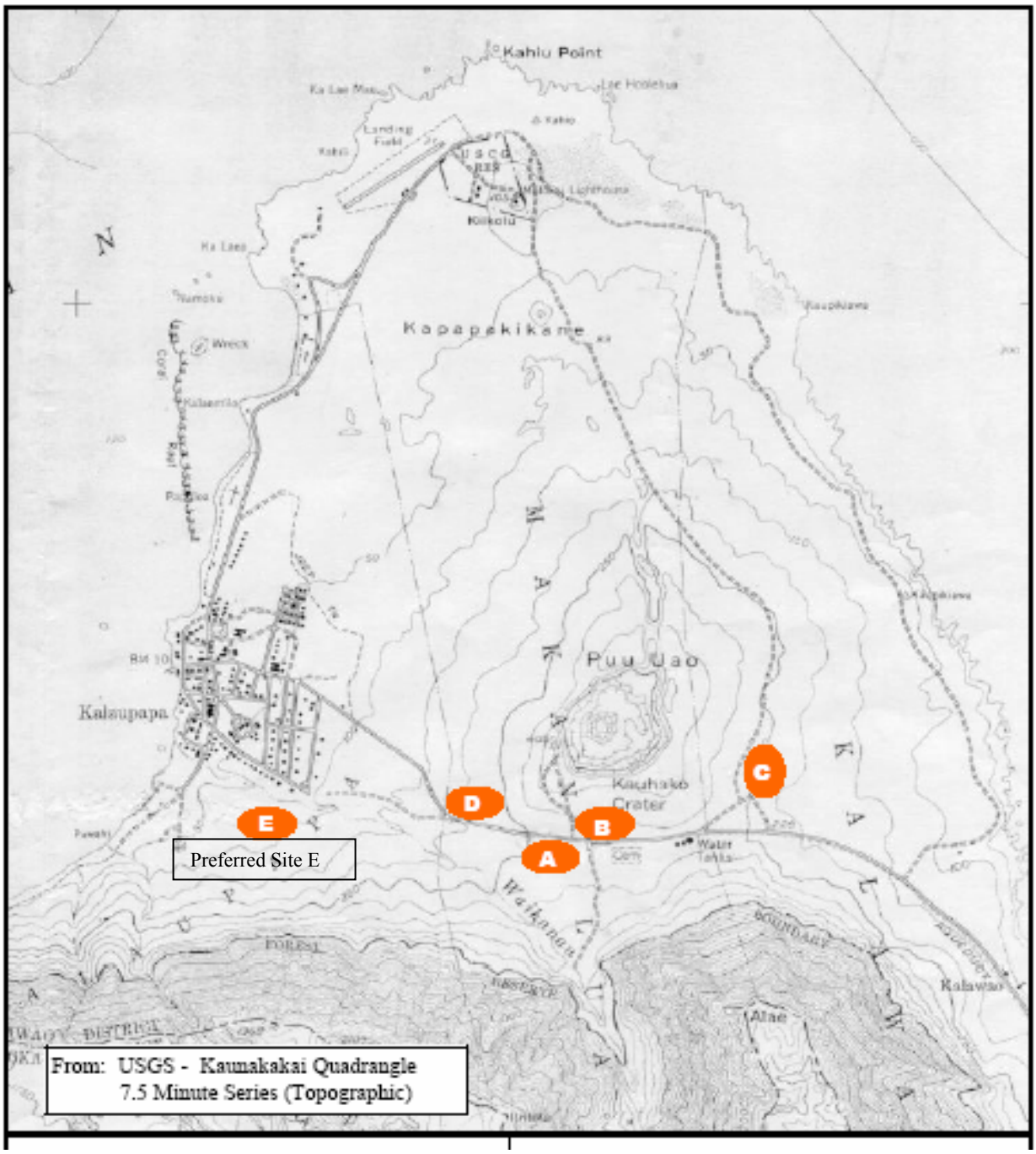

Figure 5: Sites Evaluated for Composting (Site E- Preferred)

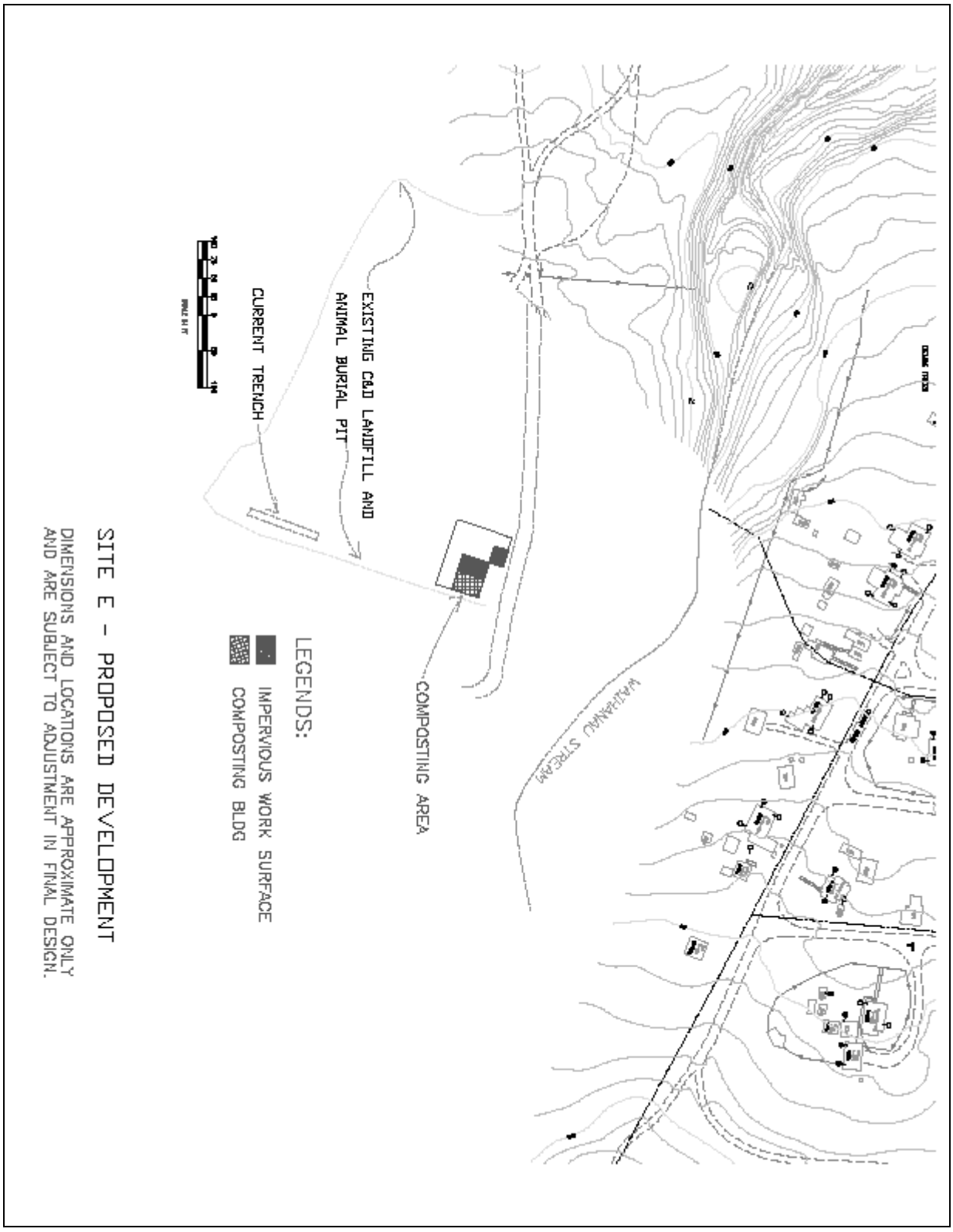

Figure 6: Site E Composting Plan

Picture of Site E

Picture of Site E

Solid Waste Collection

Solid waste collection is anticipated to be at least once per week, and no more than twice per week. Initially, no changes would be made to the current solid waste collection schedule and practices. Once the recycling facility and composting facility are operational, collection of separated recyclable materials, compostable materials, and trash (three separate containers) will begin. Recyclable materials will be delivered to Building 259A, compostable materials will be delivered to the composting facility proposed for Site E. Trash will be delivered to Building 259A for final sorting, compacting and interim storage. Delivery of trash to Building 259A is anticipated to be on trash collection days, at least once per week, and no more than twice per week.

Participation rates and compliance success for the recycling and composting programs have not been scientifically estimated, but assuming a 75 percent participation rate for residential collection programs and a 100 percent participation rate for food service, administrative facilities and green waste diversion, a total of 69 tons per year could be diverted, leaving 23 tons per year of trash. At an assumed density of 150 pounds per cubic yard, this trash would have a volume of approximately 307 cubic yards per year.

Waste Minimization Program

Another action common to both action alternatives is a concerted effort to reduce the amount of solid waste that requires handling. The approach will require the management agencies and the resident community to take a critical look at materials delivered to the peninsula and find ways to reduce waste before it is sent to the park. Items may be ordered with minimal or without associated packing material and in bulk rather than individually. For example, a large portion of materials come to the peninsula in cardboard boxes leading to a large amount of cardboard currently being disposed of in the landfill. If goods were shipped in reusable containers, about three tons of waste per year could be avoided. NPS has limited ability to control materials and goods and the success of this endeavor will depend upon the participation of the resident community and cooperativeness of the other agencies that operate on the peninsula. The NPS will implement a waste minimization program for its activities and work with the other agencies and the resident community to reduce waste coming to the peninsula, including reducing packaging, paper use, instituting “green” office practices, buying recyclable products, and performing preventive maintenance on equipment and vehicles.

Construction and Demolition Debris

NPS handling of construction and demolition (C&D) debris would be the same under both action alternatives presented in this EA. C&D debris will be sent to O`ahu on the annual barge. C&D debris at Kalaupapa consists primarily of old and deteriorated building material, including wood, shingles, doors, windows, and cement, removed from historic structures during preservation and stabilization work. Preservation, stabilization, and maintenance work on Kalaupapa's historic wooden buildings is continuous. The environmental conditions present--termites, high humidity, high temperatures, and winds--all contribute to wood rot. Because of its age, C&D debris may contain lead-based paint, asbestos, or hazardous chemicals used to preserve wood. The aged wooden buildings in the Settlement are particularly susceptible and there are nearly 200 buildings that have been prioritized in the park's resource management plan for historic preservation treatment.

The amount of C&D generated at Kalaupapa each year from the preservation work on buildings is estimated to average between 30 and 45 tons. This range is based on an average of three tons of C&D waste currently being generated for each building receiving preservation treatment (approximately 70 percent of the weight is estimated to be in removed roof shingles). It is estimated

that C&D at Kalaupapa would average at about five cubic yards/ton, requiring between 150 and 225 cubic yards of storage space each year. On barge day the containers would be rolled on to the annual barge for transport off-site to O`ahu. Construction projects contracted out will need to include provisions for the contractor to dispose of construction debris into an approved landfill. Two privately operated landfills on O`ahu are authorized at accept C&D wastes.

Hazardous Waste

Currently, Kalaupapa has a hazardous waste program that properly handles and disposes of hazardous waste. Hazardous waste is stored in a designated area, shipped by barge to O`ahu for proper disposal, and tracked accordingly. The program would remain unchanged under the alternatives in this EA. Kalaupapa is a Conditionally Exempt Small Quantity Generator (CESQG) defined as follows:

- No more than 100 kilograms (220 pounds) of hazardous waste are generated per month
- Total onsite accumulation does not exceed more than 1000 kilograms (approximately 2205 pounds) of hazardous waste
- No more than one kilogram (two pounds) of acute hazardous waste is generated/month
- No more than a total of 100 kilograms (approximately 220 pounds) of any residue or contaminated soil, waste, or other debris resulting from clean up of any acute wastes is generated/month

Remaining Solid Waste

After recycling, composting, and removing the C&D and hazardous waste, it is estimated that about 20% to 30% of solid waste will require disposal. NPS considered the following methods for dealing with the remaining solid waste which can be broadly divided into two groups: on-site treatment and disposal, and off-site disposal.

On-site Treatment and Disposal:

1. Construction and operation of a landfill
2. Installation and operation of an incinerator

Off-site Disposal:

1. Transportation for off-site disposal by aircraft
2. Transportation for off-site disposal by mule
3. Transportation for off-site disposal by barge

Each alternative has specific advantages and disadvantages. A decision making tool, called Choosing By Advantages (CBA), was utilized to prioritize the alternatives to reflect maximum advantages versus costs. The CBA yielded, in order of preference:

1. Transportation for off-site disposal by aircraft
2. Installation and operation of an on-site incinerator
3. Transportation for off-site disposal by mule
4. Transportation for off-site disposal by barge

The following alternatives are listed below in the order of preference and are discussed

individually in this chapter.

1. Transport the remaining solid waste by aircraft for off-site disposal on O`ahu
2. Transport the remaining solid waste by mule for off-site disposal on Moloka`i

Either of these alternatives is fully evaluated in this Environmental Assessment and could be selected for implementation.

Preferred Alternative: Off-Site Disposal by Aircraft

The Preferred Alternative calls for transporting Kalaupapa's remaining 20 to 30% of solid waste off-site by air. Once collected, the waste would be brought to Building 259A sorted and screened for recyclables and household hazardous waste that may have been previously missed. The baler would compact the garbage into a 40-pound bale or cube. To minimize costs and increase operational efficiency, the baler would be located at the recycling center (Building 259A) and some limited storage space would be needed in Kalaupapa for days when the aircraft cannot land. NPS will adopt and utilize best management practices to ensure that the waste compacting and storage operations will be conducted in a fashion such that no solid wastes or constituents thereof will enter the environment. NPS will also ensure that Building 259A is retrofitted such that the waste compacting and storage operations will not release solid waste or constituents thereof into the environment.

Trash materials delivered to Building 259A would be sorted, compacted and transported to the air field for air transport on the next available flight. The current air cargo service contracted by the Department of Health provides five flights per week. Assuming that trash collections and processing can be coordinated with the air cargo service flights, most collected trash could be processed one day and transported the next, making the retention time for solid waste at Building 259A typically one day.

Air transport personnel would load the bales on the plane in Kalaupapa and unload the bales from the plane in Honolulu. A contractor would pick up the bales from the airport and transport them to the municipal solid waste landfill on O`ahu. Currently, there are two carriers offering airfreight or air cargo service. Consequently, the long-term viability of this option is dependent on the continuing availability of the air cargo carriers or the identification of another provider.

The capital cost for this option is estimated to be $57,000. The annual operating cost is estimated to be $169,000. Life cycle costs based on a 30-year operation have been estimated by the NPS to be $2,190,000.

The following criteria would be used to evaluate the success of air transport:

1. Heavy winter storms often make landing an airplane dangerous at Kalaupapa. Reliability factor of 75% or above is considered acceptable. For air transport, this would equate to 91 or more days per year, with no event exceeding seven or more consecutive days, without air service considered unacceptable, leading managers to consider the other options analyzed in this EA.
2. If cost of air transport exceeds the estimate by 25% or unknown operational or resource impacts are discovered, NPS managers would consider other options analyzed in this EA.

3. If the amount of solid waste exceeds estimate by 25%, the NPS may consider other options analyzed in this EA. The NPS used best available information to estimate the amount of remaining waste, including contracting with expert solid waste consultants for the information, yet there is a possibility of error.

Alternative 2: Transport by Mule to Topside Moloka`i

Alternative 2 includes hauling the remaining solid waste up the Pali Trail via mule for disposal in the Moloka`i landfill. Bales of solid waste would be transported from Building 259A to the corral where they would be loaded on mules for the approximately two mile walk up the Pali Trail to topside Moloka`i. It is estimated that a total of seven mules making five trips per week and carrying an average of 150 pounds of compacted refuse each would be required. At the topside trailhead, the solid waste would be unloaded and deposited into a dumpster and then picked up and transported by a waste hauler to the Moloka`i landfill for disposal. Although no commercial waste hauling services are presently available on Moloka`i, arrangements would be made with a local hauling service to transport the waste to the Moloka`i landfill. The alternative is a low-tech option for removing solid waste from the Peninsula.

There are challenges with this alternative. The waste hauling will nearly double the amount of use on the Pali Trail leading to increased trail maintenance. In addition, NPS would need to work with Meyer Ranch staff to allow a waste hauler to cross the privately owned property to gain access to the main road. Periodic closure of the Pali Trail due to inclement weather and rock falls could result in the need to store the baled waste until the trail is passable. Visitors coming from topside Moloka`i via the concessionaire may be impacted by the waste hauling operation should a bale break and release garbage on the trail or corral area.

The capital cost for this option is estimated to be $78,000. The annual operating cost is estimated to be $61,000 (estimate does not include the cost of transport by mule or the cost of a commercial hauler). Life cycle costs based on a 30-year operation have been estimated by NPS to be $895,000.

Table 2: Summary of Estimated Costs for Remaining Solid Waste Disposal Alternatives*

Options	Capital Investment	Annual Operations	Life Cycle
Preferred Alternative			
Aircraft to Honolulu	$57,000	$168,000	$2,190,000
Alternative 2			
Mule to Topside Moloka`i	$78,000	$61,000	$895,000
Alternative 3			
No Action	None	Continued operation of landfill	Unknown
Alternatives Dismissed			
Incinerator at Site A or Site E	$1,669,000	$244,000	$5,104,000
Barge to O`ahu	$117,000	$64,000	$2,631,000
Barge to Maui or Topside Moloka`i	$934,000	$87,000	$2,925,000
Landfill at Site E	$912,000	$190,000	$3,303,000
Landfill at Site A	$3,831,000	$385,000	$8,639,000

*Costs do NOT include recycling, composting, or waste reduction programs.

Alternative 3: No Action Alternative

Alternative 3 would maintain the status quo including the continued operation of the DOH landfill under present conditions until the DOH decides to close it down, currently scheduled for 2008. The NPS will not adopt the current solid waste facilities, nor would the NPS replace the existing DOH-operated landfill with new solid waste disposal facilities at a different location. The NPS would not implement the recycling, composting operation, and waste reduction actions. NPS would continue using existing methods to dispose of C&D and hazardous waste. It is unclear whether DOH would expand the landfill if no alternatives were available for the disposal of solid waste on the peninsula. It is unlikely that garbage service would be stopped completely, however this could occur and would likely result in accumulated garbage in the Settlement or dumping on the outskirts.

Environmentally Preferred Alternative

In accordance with NPS Director's Order-12, *Conservation Planning, Environmental Impact Analysis, and Decision-making*, the NPS is required to identify the "environmentally preferred alternative" in environmental documents. The environmentally preferred alternative is determined by applying the criteria suggested in the National Environmental Policy Act (NEPA) of 1969, which is guided by the Council on Environmental Quality (CEQ). The CEQ (46 FR 18026 - 46 FR 18038) provides direction that "[t]he environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA's Section 101", which considers:

1. fulfilling the responsibilities of each generation as trustee of the environment for succeeding generations;
2. assuring for all generations safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
3. attaining the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
4. preserving important historic, cultural and natural aspects of our national heritage and maintaining, wherever possible, an environment that supports diversity and variety of individual choice;
5. achieving a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and
6. Enhancing the quality of renewable resources and approaching the maximum attainable recycling of depletable resources (NEPA Section 101(b)).

The Council on Environmental Quality states that the environmentally preferable alternative is "the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources (46 FR 18026 – 46 FR 18038)." According to NPS NEPA Handbook (DO-12), through identification of the environmentally preferred alternative, the NPS decision-makers and the public are clearly faced with the relative merits of choices and must clearly state through the decision-making process the values and policies used in reaching final decisions.

Clearly the recycling, composting, and waste reduction efforts are environmentally preferred. These efforts are included in each action alternative and clearly meet NEPA criterion six including "approaching the maximum attainable recycling of depletable resources" without compromising natural, cultural, or community values. Reducing waste before it is created is environmentally sound. In addition, the composting operation may reduce the feral pig population which is a long term benefit to the other plants and animals on the peninsula.

The results are less clear for managing the remaining solid waste. Each alternative has advantages and disadvantages relating to the NEPA criteria. The analysis suggests that the Preferred Alternative of air transport is the Environmentally Preferred Alternative because it minimizes the physical imprint of handling and storage facilities on the environment. Daily air transport of baled solid waste would meet NEPA criteria one, two, four and five including fulfilling NPS responsibilities as trustee of the maintenance of Kalaupapa, for assuring a safe, healthful, productive, and aesthetically and culturally pleasing surroundings, preserving important historic and cultural aspects of our national heritage and maintaining an environment that supports diversity and variety of individual choice, and achieving a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities.

Alternative 2, mule transport, is also an environmentally sound alternative. It is a low tech solution that is used in other national parks. Alternative 2 would meet NEPA criteria one, two, four and five similar to air transport. The O`ahu landfill appears to be better managed than the landfill on Moloka`i making air transport a slightly more environmentally preferred alternative because the final disposal site is the O`ahu landfill.

Alternative 3, No Action, is the least environmentally preferred alternative because of the on-going impacts from the current solid waste management practices.

Alternatives Considered But Not Selected

The following options have been considered but not selected due to environmental impact, jurisdictional and/or regulatory conflicts, or not being feasible due to excessive capital, operating and life cycle costs.

Install an Incinerator

NPS considered disposing of the remaining solid waste by installing and operating an incinerator at Site A or Site E. Both sites were evaluated and final location was to depend upon discussions with Hawaiian Homelands. A small scale incinerator would achieve the solid waste management goals and would have the following characteristics.

- Present incineration technology is capable of achieving about a 90% reduction in the weight of the disposed material. The residual ash and other bypass materials would be collected and stored on-site until transported to Honolulu.
- The incinerator would be placed on a concrete pad and a controlled perimeter fence would be installed. Two 12,000-gallon fuel tanks would be required to store the propane, diesel or bio-diesel utilized as fuel. The incineration operation would be fossil fuel dependent and non-renewable if diesel or propane is used, although it may be possible to use bio-diesel to run the incinerator. Incinerators are loaded and unloaded manually, use electric power for process control, and require fuel to operate.
- Incinerators presently manufactured use a two-stage burning process with the second stage, or after-burner, producing a very high temperature (1600 degrees F). High temperature and retention time ensure complete combustion of waste and minimizes the creation of dioxin and furan gases in the stack emission. The DOH, Air Quality Branch, pursuant to the Clean Air Act (40 CFR 60) regulates air emission on various installation including incinerators. Hawaii Administrative Rule, HAR 11-60, contains relevant requirements for new stationary sources. Recent revision to 40 CFR 60 imposes stringent requirement on stack emission monitoring; operator qualification and training; annual performance verification which include quantitative testing for 11 constituents; record keeping and annual reporting.
- The incinerator would have been co-located with the composting facility. Co-locating the composting operation with the incinerator would reduce disturbance and make operations more efficient and cost-effective. Park maintenance staff could work on both operations at the same site and waste materials for composting and incineration could be hauled in the same vehicle. Site design concepts call for a gravel-surfaced access road, site preparation and gravel base course for the equipment areas, concrete support piers for the fuel storage tanks, a fence around the site, and an enclosure for the incinerator. The total surface area disturbed for both the composting and incinerator would be less than three acres. The installation of the incinerator, fuel storage tanks and composting building would cover over about 2,300 square feet of surface area.

An incinerator was not pursued at this time because of challenges with maintaining compliance with applicable National Park Service regulations governing solid waste disposal activities and

environmental impact. An incinerator is considered a solid waste disposal facility and 30 CFR Part 6 (see Chapter 2) requires the Regional Director to certify that 12 criteria are met before construction. To pursue an incinerator NPS would have to map the 500-year floodplain to ensure those sites are not located within it (Criteria 8). The NPS has also not exhausted reasonable alternatives for solid waste disposal outside of park boundaries (Criteria 2). In addition, the air quality impacts from an incinerator are much greater than those from the Preferred Alternative and Alternative 2.

Transport by Barge to O`ahu

Under this option, remaining solid waste would be collected, compacted, and stored on-site for shipment by barge to Honolulu Harbor on O`ahu. Once on O`ahu, the containers would be transported by a commercial waste hauler to the City and County landfill located at the Waimanalo Gulch on west O`ahu. Solid waste would have to be first compacted and then loaded into cargo containers for long-term storage, from nine months to a year, because barge service to Kalaupapa is possible only during the summer months when the ocean is calmer. Two sets of cargo containers would be purchased or leased, one set for delivery to Kalaupapa on the barge and one set for shipping out full on the barge. Storage of processed materials awaiting transportation would occur outside of the processing facility (Building 259A). Bales could be stored temporarily in available space inside the building, or carried directly into cargo containers for storage until shipping via barge to the landfill on O`ahu.

Kalaupapa's annual supply barge would be large enough to accommodate the remaining solid waste. Normally, Kalaupapa contracts for one annual barge trip from Honolulu for the delivery of provisions, equipment and fuel for the patients, DOH and NPS, and occasionally for construction and maintenance materials. Although scrap materials are normally loaded onto the barge for the return trip to Honolulu, the barge is otherwise nearly empty. Under this option, there would be minimal additional expense to the park for the barge to take the solid waste from Kalaupapa to O`ahu.

There are several challenges to the barge option. The City and County of Honolulu's Department of Environmental Services (DES) expressed concern over accepting wastes that had been stored for a long period of time and indicated the waste would be acceptable if it was not seriously degraded and is burnable as fuel. In addition, the large number of containers needed for long term storage of the baled trash could attract insect and animal pests, generate odors, and result in visual impacts.

Transport by Barge to Maui

This option called for collection and storage of solid waste for shipment off-site via barge to the Maui County-operated landfills on Maui. Upon arrival at Kahului (Maui's port), the solid waste would have to be off-loaded from the barge and trucked by a contracted waste hauler to the landfill. Transporting solid waste to Maui would significantly increase transportation costs (as noted, the annual barge from Honolulu is paid for by the in-bound shipping with an essentially "free" ride on the return trip). Maui County's Solid Waste Division appears willing to accept Kalaupapa's solid waste and the landfill has a projected design life through 2012 however, DOH has unresolved concerns on the technical adequacy of this landfill's design and construction. In addition, the large number of containers needed for long term storage of the baled trash would attract insect and animal pests, generate odors, and result in visual impacts.

Construct a Landfill

NPS considered construction of a landfill at Site E. A report, *Landfill Siting Analysis* (Friesen 2003), evaluated five potential sites for locating a future landfill operation and, based primarily on existing environmental conditions and engineering characteristics, ranked each of the five sites. Site

evaluation criteria consisted of the following: topography, precipitation, wind, availability of soils, depth to groundwater, groundwater aquifer resource, proximity to water supply well, proximity to surface water, historic and archeological resources, drilling and blasting requirements, rare and endangered species, transportation routes and distance, aesthetics, construction costs, and NPS ability to use site.

Site E received the highest ranking by the NPS consultant for a landfill based on its environmental and engineering characteristics. The underlying soil at Site E is fine-grained, deep and suitable for use as a landfill cover. Site E is located a short distance away from the existing landfill and thus would be considered a new site. The existing access road to the DOH-operated landfills would be utilized as access to Site E. The area around Site E is disturbed being previously bulldozed and cleared of vegetation, and is not immediately visible to tour groups and the residential population at the ground level. Site E would not impact a wetland and is outside of the identified tsunami inundation zone, and about a two-mile distance from the airport runway. Site E is located on Hawaiian Home Lands and the Hawaiian Homes Commission has informed the NPS that they will not allow the construction of a landfill on their lands at Kalaupapa. As the landowner, the DHHL determines land uses on their property. In addition, construction of a landfill at Site E faces a similar challenge of compliance with NPS 36 CFR Part 6 as the incinerator installation option.

Site A was also considered for a landfill, receiving the second highest ranking as a landfill location based on its environmental and engineering characteristics. Site A is located next to the road connecting the settlement with Kalawao thus requiring relatively little additional disturbance to provide access to the facility. This area was previously impacted during the historic period for the purposes of vegetation clearing for cattle pasture which is evidenced today by mounds of bulldozed material. The site also served as part of a dairy farm during the historic period. The presence of a landfill at this location would present a visual intrusion with regard to the NPS certified cultural landscape, the Damien Road historic road corridor to Kalawao Settlement, and the immediately adjacent historic Kahaloko Cemetery. The area has a gentle slope and is outside of the identified tsunami inundation zone, contains no wetlands, and is about two miles distance from the airport runway. Site A is not located on Hawaiian Home Lands or on Conservation District lands and is located about a mile from any residences in the settlement.

Conceptual layouts for a lined landfill at Site A were prepared by an NPS consultant. The zone of accumulated alluvium and colluvium is comprised of soil mixed with gravel, cobbles and occasional boulders. Dense cobbles and boulders were encountered less than five feet below grade. Although the material at Site A is rocky, it would be suitable for use as landfill cover if the larger cobbles and boulders were removed or be utilized to construct the perimeter berm. Because of the rainfall level, a plastic tarp would need to be placed over the refuse at the end of each working day. The tarp would direct incident precipitation away from the working face of the landfill. The landfill operation would have to be monitored for gases.

The conceptual design contains approximately 14,000 cubic yards of space for refuse disposal which, based on the projected amount of solid waste requiring disposal at Kalaupapa, would give this facility about 35 years of disposal capacity. The landfill would meet DOH's SHWB requirements and qualify as a small community landfill. To provide groundwater protection, the landfill would be double-lined to provide secondary containment. The liner would be designed to meet the requirements for an alternative liner system under the RCRA, Subtitle D. The lined landfill would include a leak detection system and the refuse disposal area would be excavated to a depth of 12 to 15 feet.

Site A is located in an area that the DOH's SHWB requires additional measures be taken to protect groundwater quality. Site A is located above the Underground Injection Control (UIC) line. This line has been established at its present location by the DOH's Safe Drinking Water Branch to protect groundwater quality by restricting underground injection of wastes. Although UIC regulations do not specifically apply to solid waste facilities, the SHWB requires additional measures be taken to protect groundwater quality at sites above the UIC line. At this site, the SHWB has indicated that a landfill liner system that includes a leak detection system would be required to collect leachate (liquid containing dissolved or suspended materials that has percolated through solid waste). Moreover, all of the leachate collected in the liner would require treatment. Consultants have estimated that the landfill when fully developed would generate 500,000 to 600,000 gallons of leachate/year. Leachate treatment is costly (estimated to be 10 to 20 cents/gallon), and would be required throughout the operational life of the landfill as well as during the post-closure period. The alternative methods identified for leachate treatment call for either discharge into a wastewater treatment plant, evaporation, or reverse osmosis.

A landfill at Site A was rejected because of cost, operational complexity, and environmental impact. Compared to other options the capital cost would be three to four times, the annual operating cost two to three and one-half times as high, and the life cycle cost two to four times as high. The required lined landfill would produce from 500,000 to 600,000 gallons of leachate/year and would cost the park about $100,000/year to treat. The environmental impacts to the cultural landscape and aesthetics of Kalaupapa NHP would be undesirable.

Install the Trash Sorting/Recycling at Site E

The NPS considered installing the garbage sorting and recycling operation at Site E. NPS would construct a new building for the operation adjacent to the composting facility. The new building would house the conveyer belt for trash sorting, compactors for recycling and trash, and storage containers for recyclables. The NPS decided against Site E because there is an existing building (259A) that can be used for trash sorting and recycling, Site E would require greater extension of utilities leading to greater costs and environmental impact, and Building at Site E could require road and bridge improvements that are out of the scope of this project. Consolidating recycling and composting may be considered in a later planning process.

Kalawao

Locations for solid waste management facilities on the Kalawao side of the peninsula were examined and dismissed for the following reasons: facilities on the Kalawao side would be more intrusive on the historic setting, the local community would likely object, and the facilities would be too far from the source of waste generation.

Regular Boat Service

Shipping off-site by commercial boat on a weekly or monthly basis was considered but dismissed for this analysis. The challenging ocean conditions on the peninsula including tides, north shore waves, and a rocky bottom make landing at Kalaupapa extremely dangerous for up to nine months of the year.

CHAPTER 4: AFFECTED ENVIRONMENT

Cultural Resources

Kalaupapa has a rich and tragic history. In 1865 Kamehameha V approved the Act to Prevent the Spread of Leprosy leading to the forced isolation of leprosy patients at Kalaupapa. The first group of leprosy patients arrived in January 1866 to a peninsula with no facilities, medical care, or assistance. The first arrivals established a colony at Kalawao near the permanent water source of Waikolu stream. In order to accommodate this government-imposed segregated community, the Native Hawaiian community then living at Kalawao was displaced via land exchange, land purchase, or eviction. By 1895 plans were being implemented to move the colony to the western shores of the peninsula to the Kalaupapa Settlement, which resulted in the additional displacement of Native Hawaiians living at that location as well. From that time until 1969, when forced isolation of leprosy patients ceased, an estimated 8,000 people were sent into exile at Kalaupapa. Today, the remaining resident patient community serves as the park's most valuable heritage resource.

The Kalaupapa region had originally supported a large Hawaiian population first established 1,000 years before the establishment of the first Hansen's Disease Settlement on the peninsula. A systematic inventory of known sites in Kalaupapa is underway. Nonetheless, the most recent summary of archeological sites include a range of sites: at least 15 religious temples (*heiau*); several *ko`a* or fishing shrines; a multitude of burial sites; a *holua* sled; several caves with human artifacts' and hundreds of agricultural terraces, habitation sites, and other archeological features.

The majority of Kalaupapa's historic structures are connected with the presence of leprosy patients, initially at Kalawao and later at the Kalaupapa Settlement. Many examples of the historic resources connected with leprosy patients exist today and include hundreds of stone features, the two historic churches at Kalawao, several cemeteries containing thousands of burials, and the 260 buildings and structures existing within the settlement. Kalaupapa NHP is listed as a National Historic Landmark (NHL) historic district and also contains historic properties listed on the National Register of Historic Places (NRHP). The Moloka`i lighthouse and its supporting structures are separately listed on the National Register as a NHL historic district. All NRHP listings, however, do not provide a full representation of the historic resources located within park boundaries.

Kalaupapa's structures, over 400 during the first NPS inventory in 1977, have been evaluated for historical significance. Of these, 260 are considered contributors to the NHL and are prioritized by the NPS in the park's resource management plan for preservation, stabilization, and maintenance. Priorities are based on: (1) the importance of the structure in interpreting Kalaupapa's Primary Interpretive Theme; (2) the importance of the structure in relation to the most important zones or association of structures as they relate to the theme; (3) the importance of the structure in providing an essential community service; and (4) the structure's conformance to integrity and feasibility criteria listed in *National Park Service Criteria for Historical Areas*. Since the 1977 inventory, 18 buildings on the original priority list have been lost. Those not prioritized in the park's resource management plan were judged to be already beyond stabilization when originally evaluated or are buildings built after 1969 and are not considered historic.

The resident patients, those patients who live elsewhere, and those who have passed on are crucial to understanding the history of Kalaupapa and are considered a great resource for ethnographic data.

Their knowledge, memories and personal belongings of life in the Settlement provide visitors, now and in the future, with a sense of the hardships they endured and strength of character they built. Many patients have donated or loaned personal objects and photographs to the NPS. The NPS has recently constructed a curatorial storage facility where the collections will be cared for.

The Area of Potential Effect for the project is the entire Kalaupapa NHL, including the Pali Trail. Three historic properties in particular have been identified as being areas potentially affected by the actions currently proposed in the plan. The first is listed on the National Register of Historic Places and includes the entirety of Kalaupapa National Historical Park as a National Historic Landmark (1976). The second and third properties have not yet been designated with an official Determination of Eligibility, but are currently believed to meet the eligibility criteria for listing. These include the historic Kalaupapa "3 Trail" and multiple portions of the 2005 NPS-certified Kalaupapa and Kalawao Settlements Cultural Landscape. The National Historic Landmark is essentially equivalent to the park's legislative boundary and the cultural landscape is identified as the Settlement Areas. Archeological surface surveys were completed in August of 2005. The survey results revealed no intact archeological surface features at Site E.

Socioeconomic and Environmental Justice

Under a policy established by the Secretary of the Interior to comply with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, agencies of the Department of the Interior should identify and evaluate anticipated effects, direct or indirect, from the proposed project or action on minority and low-income populations and communities, including the equity of the distribution of the benefits and risks. Environmental documents should clearly state the impacts and evaluate the environmental consequences of the preferred alternative on minority and low- income populations and communities.

The Kalaupapa Settlement is composed of patients, employees of both DOH and NPS, and day use visitors. In 1998, there were 57 patients, 42 DOH employees, 14 permanent and six seasonal NPS employees, three volunteers, and five clergy at Kalaupapa. In 2001, there were 44 patients, 34 DOH employees and 19 NPS employees. As of July 2004, there were a total of 37 patients at the Kalaupapa Settlement, 31 DOH employees, 24 NPS employees and three members of the clergy within the Settlement. Presently, an average of 27 visitors visits the park each day.

The Hansen's Disease patients residing at Kalaupapa are subsidized by funds in state and federal programs. The patient's food, housing, and medical care are provided through these programs, the majority of the patients receive Social Security, and some work for the DOH. Most of the patients fall into the category of a low-income and a disadvantaged community. Many of the patients are in their seventies, eighties, or nineties. Of the 34 patients, 20 live independently within the Settlement, seven reside at the day care facility, and seven reside at DOH's Hale Mohalu facility, which is a designated wing of Leahi Hospital in Honolulu designated solely for use by Kalaupapa Hansen's Disease patients. As the patients age and require additional medical care, it is likely that patients will move into the Settlement's day care center or to Hale Mohalu where more complete medical services are available.

DOH and NPS employees have a variety of living arrangements including some residing in the Settlement, some residing topside Moloka`i and commuting up and down the Pali Trail by horseback

or on foot, and some maintaining residences topside and in the Settlement. The DOH and NPS employees are paid based on governmental rates per job category and would likely not be considered a low income community.

Information on income level, poverty level, employment, disability, race, fluency with the English language, and education was queried within Kalaupapa, the communities adjacent to the park, the rest of the island of Moloka`i, and for Hawai`i in general. Income is based on a per-household measurement. Unemployment applies to all individuals aged 16 years and older. Disability numbers are a percentage of residents within the traditional working ages of 21-64 years. Minority percentage records percentage of residents who are native Hawaiian, as that was the only race present that substantially differed from both island and state averages. The "Minimal fluency in English" heading is paraphrased from the census terminology of "Language other than English" and sub-category "Speak English less than 'very well.'" Lacking Secondary Diploma is a combination of the census categories of "Less than 9th grade" and "9th to 12th grade, no diploma."

Table 3: 2000 U.S. Census Data

	Number of Residents	Number of Census Blocks	Income	Poverty percentage (families)	Poverty percentage (individual)	Un-employment percentage	Disability percentage	Minority percentage (Native Hawaiian)	Minimal Fluency in English	Lacking Secondary Diploma
Within Kalaupapa	**147**	**1**	**$9,333**	**0**	**0**	**0**	**60.8**	**48.3**	**29.9**	**60.5**
Adjacent to Kalaupapa	**1,575**	**1**	**38,359**	**18.4**	**21.4**	**6.9**	**29.1**	**39.2**	**14.4**	**15.8**
Island of Moloka`i	**5,682**	**6**	**$31,699**	**18.1**	**23.4**	**6.5**	**27.2**	**34.5**	**9.9**	**20.9**
State of Hawai`i	**1,211,337**	**646**	**$49,820**	**7.6**	**10.7**	**3.8**	**17.1**	**9.4**	**12.7**	**15.4**

The analysis of existing environmental impacts included whether the land within the planning area has documented environmental impacts from waste and industrial byproducts. The following environmental justice areas were examined and presented in Table 4. While there was a single site near the study area with environmental impacts, that location adhered to regulatory compliance requirements.

Table 4: Existing Environmental Justice Impacts

	Superfund Sites	Brownfield Sites	RCRA (Except UST) Sites	UST sites	Toxic Registry Sites	Water Discharge Permit Sites	Storm Water Discharge	Air Quality Emissions Sites	Radiation Release Sites	Limited Medical Services
Within Kalaupapa Park Unit	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**N/A**
Within Adjacent Census Blocks	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**
Compliance Violation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**N/A**

Air Quality

Air quality at Kalaupapa is regulated by the Environmental Protection Agency (EPA) and the Hawai`i Department of Health (DOH). The EPA has established National Ambient Air Quality Standards (NAAQS) to protect the health and welfare of the public for six so-called "criteria" or conventional pollutants - carbon monoxide, ozone, nitrogen oxides, sulfur dioxide, lead and particulate matter (PM^{10} and $PM^{2.5}$). In addition to the federal standards, DOH has adopted into state law the same or more stringent standards for the criteria pollutants and has also set a standard for hydrogen sulfide. Table 5 shows the state and federal standards. The State of Hawai`i is responsible for developing and implementing plans that assure compliance with EPA standards. New source review permitting is a part of the state's implementation plan. In addition to programs to achieve and maintain the NAAQS, Hawai`i is also responsible for conducting air quality monitoring, evaluation, and regulation of hazardous air pollutants and the regulation of industrial sources, motor vehicles, and area sources (e.g., open burning, and small companies like dry cleaners and gasoline stations). At this time, neither agency specifically regulates greenhouse gases such as carbon dioxide, methane, and nitrous oxide.

The Code of Federal Regulations Title 40 requires that each state create a network of air monitoring stations (CFR 1995). There are no monitoring stations on the island of Moloka`i where Kalaupapa NHP (NHP) is located, and there is limited air quality data. The nearest known stations are on O`ahu and Maui. In addition, the NPS Inventory and Monitoring program also does not monitor air quality on Moloka`i nor identify it as an issue in the islands. The data from O`ahu and Maui is of limited value because of the distance between the islands. In addition, the winds generally blow from the north-east reducing the potential for air pollutants traveling from other islands to Kalaupapa.

With little numerical evidence, observations indicate that Kalaupapa has good air quality. Kalaupapa enjoys excellent visibility throughout the year. Persistent trade winds blowing from the north east, the more remote location and the absence of major air polluting activities, suggest high air quality. On O`ahu, where it is measured, trade winds blow almost constantly (calm less then 3.2% of the time) suggesting wide dispersion of air pollutants in the region.

There are no major emission sources within the boundaries of Kalaupapa or on the island of Moloka`i where the park is located. A major source is any facility that emits 100 tons or more of any criteria pollutant per year. Based on observation, potential sources of air pollutants at Kalaupapa involve dust from roads and construction and emissions from the vehicles and airplanes. Particulate matter is generated from vehicle traffic on unpaved roads and from work on historic structures. Along with car emissions, small airplanes land and take off from Kalaupapa once or twice a day emitting various amounts of criteria pollutants and the greenhouse gas carbon dioxide. These sources generate a small amount of particulate pollution and carbon dioxide pollution.

Table 5: National and State Ambient Air Quality Standards

AIR POLLUTANT	AMBIENT AIR QUALITY STANDARDS	
	Hawai`i (State Ambient Air Quality Standards)	**Federal** (National Ambient Air Quality Standards)
Carbon Monoxide		
1-Hour	**10 mg/m3**(9 ppm)	**35 ppm**(40 mg/m3)
8-Hour	**5 mg/m3**(4.4 ppm)	**9 ppm**(10 mg/m3)
Nitrogen Dioxide		
1-Hour	**--**	--
24-Hour	**--**	**--**
Annual	**70 µg/m3** (0.04 ppm)	**0.05 ppm** (100 µg/m3)
Sulfur Dioxide		
3-Hour	**1300 µg/m3**(0.5 ppm)	—
24-Hour	**365 µg/m3**(0.14 ppm)	**0.14 ppm** (365 µg/m3)
Annual	**80 µg/m3**(0.03 ppm)	**0.03 ppm** (80 µg/m3)
Ozone		
1-Hour	—	**0.12 ppm** (235 µg/m3)
8-Hour	**157 µg/m3** (0.08 ppm)	**0.08 ppm** (157 µg/m3)
PM^{10}		
24-Hour	**150 µg/m3**	**150 µg/m3**
Annual	**50 µg/m3**	**50 µg/m3**
Lead		
Calendar Qtr.	**1.5 µg/m3**	**1.5 µg/m3**
Hydrogen Sulfide		
1-Hour	**35 µg/m3** (25 ppb)	---
$PM^{2.5}$		
24-Hour	---	**65 µg/m3**
Annua	---	**15 µg/m3**

NOTE: Standards appear in bold, conversions are in parentheses.
ppm = parts per million / ppb = parts per billion
SOURCE: Hawai`i Administrative Rules, Chapter 59, Code of Federal Regulations, Title 40, Part 50

Endangered Species /Wildlife/Vegetation

As in many areas of Hawai`i, the ecology has been impacted by invasive species. Feral pigs (*Sus scrofa*), goats (*Capra hircus*), and Axis deer (*Axis Axis*) are the major herbivores present at Kalaupapa. Pigs are present on the outskirts of the Settlement, most noticeably near the landfill, in

the woody areas south of the Kalawao road, and in the upland valleys. The rooting of the pigs has destroyed and continues to destroy native and Polynesian plants and cultural resources. Goats are found in limited numbers in the remoter areas. Axis deer (*Axis axis*) originally from India, are present in large numbers and now browse over much of the peninsula. Axis deer also do damage to native and Polynesian plants. Feral cats (*Felix catus*) are present outside the Settlement and rats (*ratus exulans*, *R. rattus* and *R. norvegicus*), mice (*Mus musculus*), mongooses (*Herpestes auropunctatus*), toads (*Bufo marinus*) and species of small lizards are common in the park. Several species of non-native birds are common throughout the park, including within the Settlement. These include the Common mynah (*Acridotheres tristis*), Zebra dove (*Geopelia striata*), House sparrow (*Passer domesticus*), Japanese white-eye (*Zosterops japonica*), and the Red cardinal (*Cardinalis cardinalis*).

The introduction of non-native grasses and forbs has also impacted the ecology. During the late 1840s and 1850s, much of the peninsula was used to grow sweet potatoes commercially for the California Gold Rush. During the earliest period of the leprosy Settlement, most of the peninsula was grazed over by cattle and horses, and the valleys contained taro (*Colocasia esculenta*) fields. The eventual cessation of agriculture and grazing allowed the non-native grasses and scattered woody shrubs already present to spread and become dominant over the peninsula. Inland portions of the peninsula are now covered with dense stands of introduced species including lantana (*Lantana camera*) and Christmas berry (*Schinus terebinthifolius*), interspersed with naupaka (*Scaevola taccada*) and koa haole (*Leucaena leucocephala*). Mango (*Mangifera indica*) and coconut (*Cocus nuciferus*) are present in scattered locations, usually as remnant vegetation in the vicinity of old house sites. The migratory Golden plover (*Pluvialis fulva*) is common in the grassy areas of the Settlement during the winter months.

Parts of the upper valleys and the Pu'u Ali'i Natural Area Reserve provide habitat for several species of native Hawaiian forest birds. Rare and endangered forest birds likely found within the reserve include the federally listed Moloka`i thrush (*Myadestes lanaiesnsis rutha)* and the state-listed I'iwi, (*Vestiaria cocinea)*. The Waikolu stream, the park's sole perennial stream, provides habitat for five species of native gobies. The stream valley also provides habitat for two species of damsel flies that are candidates for listing under the Endangered Species Act. The pond at the bottom of the crater is habitat for a species of native shrimp.

Although vegetation on the peninsula has also been impacted by invasive species, in tact examples of Hawaiian ecosystems remain. Isolated pockets of native plants remain, mostly along the coast, on the interior slopes of the Kauhakō Crater and within the Pu'u Ali'i Natural Area Reserve located in the southeast corner of the park. The crater contains a remnant summer-deciduous dry forest believed to be the only windward coast example of this plant community remaining in the State of Hawai`i. The Pu'u Ali'i Natural Area Reserve contains one of the best examples of `ōhia rainforest in Hawai`i. Closer to the cliffs where it is wetter, a greater variety of plants are present. These include several tree species, among them the Kukui nut (*Aleurites moluccana*), a native tree long used by Hawaiians. Three endangered plant species--'Awikiwiki (*Canavaliam molokaiensis*), Pua'ala (*Brighamia rockii*) and Makou (*Peucedanum sandwicense*) are found on the steep slopes of the cliff. Waikolu Valley and its ridges contain three federally listed endangered plant species: Carter's Panic Grass (*Panicum fauriei* var. *carteri)*, Haha (*Brighamia insignis*), and Alani (*Melicope hawaiensis*).

There are no known threatened, endangered, candidate or rare native animal species present at Site E or in the general vicinity. Wildlife found in the vicinity consists mainly of mongoose, rats, mice, feral pigs, feral cats, and several species of non-native birds such as the Common myna, the Red cardinal, and the House sparrow. The area around Site E has been previously cleared by bulldozers and is now open and covered by alien grasses and forbs. A mixture of non-native grasses such as carpetgrass (*Axonopus fissifolius*), Guinea grass (*Panicum maximum*), and herbaceous plants like Indigo (*Indigofera suffruticosa*), Air plant (*Kalanchoe pinnata*) or viney, and sprawling plants such as gray nickers (*Caesalpinia bonduc*) and nightshade (*Solanum seaforthianum*) exist there now. Nearby is a mosaic of non-natives trees and shrubs dominated by Christmas berry, Java plum and Koa haole. The area has been cleared and there is no evidence of threatened, endangered, candidate or rare native plant species in the area.

Park Operations

Under Kalaupapa's enabling Act, the NPS is responsible for providing a well-maintained community. In addition to protecting the lifestyle of the patients, this includes preserving, stabilizing, and maintaining the hundreds of historic buildings in the park. In addition, NPS employees at Kalaupapa are responsible for operating and maintaining the drinking water system, providing fire protection, protection of the native flora and fauna including federally listed species, and the identification, evaluation and protection of prehistoric and historic cultural resources and values.

NPS will continue to assume management responsibilities from DOH. In addition to assuming responsibility for solid waste management and the ongoing and continuing preservation treatment for historic buildings, NPS will be upgrading wastewater disposal facilities, replacing water lines, installing water meters, and upgrading the electrical distribution system. The NPS will be responsible operating and maintaining new and upgraded facilities. Consequently, additional personnel will be required, mostly in the fields of maintenance and facility management. Merely to take over the operation and maintenance of solid waste management at Kalaupapa, park management estimates one to three additional positions will be needed.

Visitor Experience/ Aesthetic/Visual Resources

Visitation at Kalaupapa includes those who access the settlement on the daily patient-run Damien Tours, those who view Kalaupapa Peninsula from the overlook at Pala`au State Park, and those who are guests of the residents at Kalaupapa Settlement. Since 1996, visitation to Kalaupapa has ranged between 58,000 and 87,000 people per year. On average approximately 68,000 people visit Kalaupapa each year with visitation fairly steady throughout the year. About 58,000 people visit the Kalaupapa Peninsula overlook in Pala`au State Park, while 10,000 people come to the Settlement via mule rides, hiking, or by aircraft. The highest recorded visitation of 86,989 was in 2000. The overall trend indicates a relatively stable yearly visitation rate. The number of visitors arriving by aircraft has doubled since 1999, while hiking visitors has remained about constant, averaging 2,100 visitors per year. The enabling legislation for Kalaupapa NHP calls for a limit of no more than 100 visitors per day.

Visitors to Kalaupapa may be classified into four general categories, including:

1. *Guests of Kalaupapa Settlement Residents*. The residents at Kalaupapa may invite family and friends to visit them at the Settlement. The guests may stay overnight in visitor quarters or in

private homes. They can swim and snorkel, fish, picnic, and walk through Kalaupapa Settlement unescorted and may travel beyond the Settlement if accompanied.

2. *Natural resource enthusiasts* come to the Park to view wildlife, especially the unique Hawaiian avian faunal, and the unusual native plants. These visitors access backcountry portions of the Park by hiking or guided mule.
3. *Sightseeing Visitors.* About 85 percent of Kalaupapa visitors stop at the overlook in Pala`au State Park to view the surrounding scenery, natural landscapes, geologic formations, and cultural and historical sites. Visitors can hike through the ironwood, koa, and eucalyptus forests or view Kalaupapa Peninsula and the cliff on the north coast of Moloka`i from Kalaupapa Lookout. The NPS maintains information wayside exhibits on the Kalaupapa peninsula's people, history, and archeology. Some choose to ride mules or hike the steep two mile (3.2 km) Pali Trail to Kalaupapa Settlement and take the guided bus tour.
4. *Cultural practitioners* come to Kalaupapa to gather natural materials used in ceremonies and worship, or to visit sacred sites that hold spiritual significance. Hawaiians still visit the peninsula for traditional activities.

Because an important purpose of Kalaupapa NHP is to protect the lifestyle and individual privacy of the Hansen's Disease patients, there are several restrictions for visitors at Kalaupapa. These include requirements that visitors obtain a permit from the Hawai`i State Department of Health to enter Kalaupapa Settlement (a commercial tour company arranges permits for customers, and guests of residents have their permits arranged by their sponsor), not be under the age of 16, not take photographs of patients without their written permission, and not camp overnight. Guests of Settlement residents may tour Kalaupapa and Kalawao Settlement as well as other areas of the peninsula while escorted by a resident and stay overnight in visitor's quarters. Other visitors may only tour Kalaupapa and Kalawao Settlements on a commercial tour, currently provided by Damien Tours (which is owned and operated by a Kalaupapa resident). The NPS does not offer any regularly scheduled interpretive programs or activities because of the restricted nature of visitation to the park and because tours are offered through a commercial service.

Currently, the visitor experience, aesthetics, and visual resources are negatively impacted by the methods of solid waste disposal. The landfills are unpleasant and unsightly and located near the terminus of the Pali Trail, the main entry and exit point for visitors to the peninsula. Wind blown trash and feral pigs detract from the experience.

CHAPTER 5: ENVIRONMENTAL CONSEQUENCES

METHODOLOGY FOR ASSESSING IMPACTS

The National Environmental Policy Act (NEPA) requires that Environmental Assessments disclose the environmental impacts of proposed federal action, reasonable alternatives to that action, and environmental effects that cannot be avoided should the proposed action be implemented. NEPA requires consideration of impacts including the context, intensity, duration, type, and measures to mitigate impacts. This section analyzes the environmental impacts of project alternatives.

Context of Impact

Impacts are considered at their local, regional, or national context as appropriate.

Intensity of Impact

Intensity is a measure of the severity of an impact. The intensity of an impact may be:

- *Negligible*, when the impact is localized and not measurable or at the lowest level of
- detection;
- *Minor*, when the impact is localized and slight but detectable;
- *Moderate*, when the impact is readily apparent and appreciable; or
- *Major*, when the impact is severe and highly noticeable.

Duration of Impact

Duration is a measure of the time period over which the effects of an impact persist. The duration of impacts evaluated in this EA may be one of the following:

- *Short term* impacts are those that can be reversed relatively quickly. Short term impacts typically occur only during construction and last less than one year; or
- *Long term* impacts are those that are reversed more slowly. Long term impacts usually last one year or longer.

Type of Impact

- *Adverse* impacts are those that change the affected environment in a manner tending away from the natural range of variability.
- *Beneficial* impacts are those that change the affected environment toward the natural range of variability.
- *Direct* impacts include such impacts as animal and plant mortality, damage to cultural resources, or creation of smoke, that occur at the time and place of the action.
- *Indirect* impacts are those that occur at a different time and/or place than the action. Indirect impacts include changes such as species composition, structure of the vegetation, or range of wildlife. Indirect impacts could occur off-unit such as erosion-related impacts, or general economic conditions tied to park activities.
- *Cumulative* impacts are those impacts on the environment that result from the incremental (i.e., additive) impact of direct and indirect impacts when added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such actions. Cumulative

impacts can result from individually minor but collectively significant actions taking place over a period of time.

Mitigation of Impacts

- *Avoid* conducting management activities in an area of the affected environment.
- *Reduce* the type of impact to an affected environment.
- *Minimize* the duration or intensity of the impact to an affected environment.
- *Repair* localized damage to the affected environment immediately after an adverse impact.
- *Rehabilitate* an affected environment with a combination of additional management activities.
- *Compensation* of a major long-term adverse direct impact through additional strategies designed to improve an affected environment as much as is practical.

Projects Considered in Cumulative Analysis

Wastewater Systems

To comply with the EPA regulations, the NPS undertook several assessments of the wastewater system at the Kalaupapa Settlement. Through the assessments, 22 large capacity cesspools were identified and recommendations for closure were formulated. The NPS is proposing to replace the cesspools with large capacity septic tanks and drain fields. The project is scheduled to begin in 2006.

Electrical System

The NPS has conducted a preliminary investigation into the condition of the electrical system that recommended improvements to the electrical system. It is likely some or all of these improvements will occur within 5 to 15 years. Items identified included:

- Re-conductor the entire overhead primary distribution system.
- Replace approximately 25% of the existing wood poles directly impacted by the primary re-cabling work with new.
- Provide a portable engine generator unit to serve as a back up power source for the Settlement during cable replacement work and blackouts.

Dock Repairs

During the winter months of 2004-2005, continuous sizeable swells impacted the coastline along the western side of the Kalaupapa peninsula, having a direct effect on some of the existing structures in the Kalaupapa harbor. The harbor consists of several works including a concrete and armor stone breakwater, a concrete pier including line fasteners and tie-downs, a concrete and stone masonry bulkhead wall, and a berthing channel and turning basin. A recent engineering report recommended the following improvements to the dock:

- Bulkhead Wall Repair
- Bitt and Bollard Replacement on Breakwater
- Pier Structural Repair
- Breakwater Repair
- Bulkhead Toe Structure Repair
- Berthing and Turning Basin Expansion

- Breasting Dolphin Addition
- Mooring Winch Addition
- Fendering Maintenance
- Breakwater Expansion
- Pier Reconstruction

Historic Structures

The NPS is stabilizing and restoring many of the historic structures at Kalaupapa. Kalaupapa NHP has specific authorizing legislation requiring the NPS to preserve the Kalaupapa Settlement, and to preserve and maintain the present character of the community. The Kalaupapa Settlement contains about 260 structures, almost 150 of which are listed on the park's List of Classified Structures. Maintenance of the structures is currently shared between the Hawai`i Department of Health and the NPS. Challenging environmental conditions and a reduction in State operations has contributed to the deterioration in the condition of the buildings. The NPS has undertaken stabilization and restoration of structures in the Settlement based on the priority identified in the Building Inventory completed in 1977.

Impairment

In addition to determining the environmental consequences of the preferred and other alternatives, NPS *Management Policie*s (NPS, 2001) and Director's Order-12, *Conservation Planning, Environmental Impact Analysis, and Decision-making*, requires analysis of potential effects to determine if actions would impair park resources. The fundamental purpose of the National Park System, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid or minimize to the greatest degree practicable adverse impacts on park resources and values. However, the laws do give the NPS management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the NPS management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including opportunities that otherwise would be present for the enjoyment of those resources or values. An impact would more likely constitute an impairment to the extent it affects a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- Identified as a goal in the Park's General Management Plan or other relevant NPS planning documents.

In this EA, impairment is evaluated for cultural resources, the community of Kalaupapa, and natural resources because these are resources key to the integrity of the park.

IMPACTS OF PREFERRED ALTERNATIVE

Cultural Resources

The Preferred Alternative would result in local direct long term negligible to minor adverse impacts to the historic landscape. Actions that could impact the historic landscape include the retrofit and use of Building 259A and the construction and operation of the composting facility at site E. Building 259A will house the recycling center, serve as the site of trash sorting and compaction, and have two to three cargo containers nearby to store recyclables. Trucks will be required to transport the compacted solid waste from Building 259A to the airport. Built in 1992, Building 259A was used for storage, as a motor pool, and as an auto repair shop. Building 259A is a non-contributing feature to Kalaupapa NHP and the retrofit would result in minor changes to the building including raising the roof line. Site E is located adjacent to the existing landfill and is not visible from the Settlement. The area in and around Site E has been heavily disturbed in the past by bulldozers and the historic landscape is heavily impacted.

At Site E, archeological surveys conducted in 2005 did not locate any intact surface archeological features, however it is possible that ground disturbing activities associated with construction could disturb archeological resources. If subsurface archeological features were encountered during excavation, work in the vicinity would be immediately halted and professional archeologists, including the State Historic Preservation Officer (SHPO), would be consulted.

Cumulative Impacts to Cultural Resources

The Preferred Alternative along with other infrastructure projects at Kalaupapa has the potential for local to regional long term minor adverse cumulative impacts. Improvements are in place or are being considered to the wastewater treatment, the electrical system, and the dock. These improvements are being conducted in compliance with Section 106 of the National Historic Preservation Act. However, the improvements to infrastructure may lead to minor long term adverse impacts if the cumulative effects of the improvements reduce the historic character of Kalaupapa. Separately, the historic structure stabilization and restoration undertaken by the NPS has led to local to regional long term moderate beneficial impacts.

Conclusion for Cultural Resources

The Preferred Alternative would result in local direct and potential cumulative long-term minor adverse impacts to Kalaupapa NHP (listed on the National Register of Historical Places) including:

- Changes to Building 259A would result in local direct long term negligible to minor adverse impacts to the historic landscape.
- Construction of composting facility at Site E would result in direct long-term negligible to minor adverse impacts to the historic landscape.
- The Preferred Alternative along with other infrastructure projects at Kalaupapa has the potential for local long term minor adverse cumulative impacts.

Under Section 106 of the National Historic Preservation Act, the analysis suggests that the Preferred Alternative will have an effect, but not an adverse effect on the Kalaupapa National Historic Landmark. The Preferred Alternative would not harm the integrity of the resource nor result in impairment to the cultural resources of Kalaupapa.

Socioeconomic and Environmental Justice

The Preferred Alternative would result in local direct and indirect long term minor to moderate beneficial impacts to the community of Kalaupapa by providing improved solid waste management service. Air transport would provide a cleaner and more aesthetically pleasing alternative to the existing landfill. The recycling and composting programs would promote the sustainable use of materials and could improve community pride. Air transport of waste not recycled or composted would result in local beneficial impacts to the community by removing the waste from the peninsula. Project construction and operation will provide an increase in employment and spending in the project area, resulting in a local direct and indirect short and long term negligible to minor beneficial impact on the local economy.

The potential for odors to emanate from a composting facility at E is negligible. In particular, the technology proposed for the composting system including capturing and filtering the gases emitted by the compost prior to release. This should eliminate the possibility of odors in the community. However, there is the possibility, due to mechanical or human error, that odors could emanate from the composting operation into the community. Composting at Site E would result in local negligible long term adverse impacts to the community. Because it is downwind from the community, it is unlikely odors from a composting at Site E would be detectable in the Settlement. Site E lies to the west of the Settlement and the trade winds blow from the north east. Composting odors are not considered harmful to human health, although the odors could be an unpleasant burden to a disadvantaged community. However, once again, the composting facility does include a system to capture the gases emitted from composting and it is unlikely any odors would be emitted.

In addition, odors may be detected from Building 259A where recycles and trash are sorted and processed. This building does lie within the Settlement and may result in local direct long term minor adverse impacts to the residents if the facility is not cleaned or maintained properly. Standard operating procedures will be implemented to reduce the potential that Building 259A could become a local source of odor.

Cumulative Impacts to Socioeconomic and Environmental Justice

The cumulative impacts of the improvements to infrastructure are expected to be local long term moderate and beneficial. Improved solid waste management, electrical reliability, wastewater management, and an improved dock are considered beneficial impacts to the residents of Kalaupapa. In addition, the on-going historic structure stabilization and restoration is preserving the history of the Settlement.

Conclusion for Socioeconomic and Environmental Justice

The Preferred Alternative would result in local direct long term minor to moderate beneficial impact to the community of Kalaupapa by providing improved solid waste management service. Although unlikely due to the air filter system, composting could also result in local direct long

term adverse impacts due to odor at the negligible level at Site E. If not cleaned regularly, Building 259A could result in local direct long term minor adverse impacts due to odor. The cumulative effect of improved infrastructure is local long term and beneficial. The Preferred Alternative would not harm the integrity of the resource nor result in impairment to the community of Kalaupapa.

Air Quality

The preferred alternative could lead to air quality impacts from the following sources:

1. Dust generated during construction of a composting facility
2. Composting emissions
3. Increased fuel usage by airplanes hauling solid waste to Honolulu

Construction of the composting facility at Site E would result in local short term minor adverse impacts to air quality from dust and vehicle emissions. Dust would be generated by vehicles driving to the site and during on-site construction. Impacts would be minimized by the implementation of best management practices to control dust, such as watering soil stockpiles, included in the Resource Protection Measures in Appendix A.

The Preferred Alternative includes construction of an aerobic composting system with air flow strictly controlled to reduce emissions. Air must be provided to allow aerobic bacteria and composting to flourish. However, odors generated from the composting operation will be captured and treated through the use of in-vessel composting system. Compost material would be enclosed allowing for the control of air flow in and out of the vessels. The airflow would be reversible, with vacuum or negative aeration being the normal mode of operation. This arrangement prevents odors from escaping. The process air from composting and curing piles and building air would be routed to a biofilter for odor control. The operation of a composting facility would have a localized, long-term negligible to minor adverse impact on air quality.

Air transport of baled solid waste from Kalaupapa would result in up to 94 tons of waste per year being flown out to Honolulu. This added weight would result in the increased use of fuel. It is difficult to estimate the amount of fuel used because it depends upon the weight of the plane, atmospheric conditions such as wind, and plane maintenance. The distance to O`ahu is approximately 25 miles it appears the increase in weight of the planes may result in a local to regional long term negligible increase in criteria pollutants and carbon dioxide emissions, although exact calculations were not performed for this analysis.

Cumulative Impacts to Air Quality

The other proposed infrastructure improvement projects would add local short term local minor adverse impacts to air quality, in particular, adding particulate matter from construction. To reduce impacts NPS will implement Best Management Practices to reduce fugitive dust during construction of the wastewater improvements, historic structure work (already in place), and for the electrical system work.

Conclusion for Air Quality

The Preferred Alternative would result in a local long term negligible adverse impact to air

quality from increased airplane emissions and composting operations. In addition, a local short and long term minor adverse impact would result from the construction of the composting facility. Taken together, with the cumulative impacts, the Preferred Alternative would result in a local long term negligible to minor adverse impact to air quality.

Endangered Species/ Wildlife / Vegetation

The Preferred alternative would result in no direct effect to candidate, threatened or endangered species. Site E was selected, in part, because it is previously disturbed and contains minimal habitat value. Site clearing will impact non-native species found at the site and potentially limited native vegetation found along the margin of the site. The installation of a concrete pad for the composting facility and the laying of a gravel access road would disturb about three acres of non-native forage grasses and forbs. The Preferred Alternative would result in local short term negligible adverse impacts to wildlife and vegetation. In addition, the Preferred Alternative would compost food scraps from the dining hall, removing a food source for the feral pig population. This could lead to indirect long term minor to moderate beneficial impacts to vegetation and wildlife if feral pig populations are reduced.

Cumulative Impacts to Endangered Species/ Wildlife / Vegetation

Of the future infrastructure projects at Kalaupapa, the electrical line project has the greatest potential to impact the endangered species, wildlife, and vegetation. Because the line travels through intact habitats, mitigation measures would needed to be employed to reduce impacts. The other infrastructure projects are mainly in the Settlement area and would likely result in negligible impacts to endangered species, wildlife, and vegetation.

Conclusion for Endangered Species/ Wildlife / Vegetation

The Preferred Alternative would result in no effect to candidate, threatened, or endangered species and construction would result in local short term negligible impacts to wildlife and vegetation. The Preferred Alternative would not harm the integrity of the resource nor result in impairment to the natural resources of Kalaupapa.

Park Operations

The Preferred Alternative would result in local direct long term adverse minor to moderate impacts to park operations. Increased facility management responsibilities would include collecting, sorting, and compacting solid waste for recycling and air transport, and operating the compost facility. Air transport would require short term solid waste storage and loading. The NPS estimates it may need one to three additional staff persons to manage the solid waste.

Cumulative Impacts to Park Operations

The Preferred Alternative along with other improvements would result in both beneficial and adverse local long term minor to moderate impacts to park operations. On the adverse side, additional facilities would result in a greater facility management burden to maintain including a composting system, improved septic systems, and electrical systems. On the other hand, improvements to the dock, electrical system, septic systems, and solid waste handling will greatly reduce the long term burden of "band-aid" fixes to these failing systems.

Conclusion for Park Operations

Preferred Alternative will result in local direct long term minor to moderate adverse impact to park operations from increased facility management responsibilities by taking on the management of solid waste. Additional staff resources will be needed to accomplish the preferred alternative.

Visitor Experience/ Aesthetic/ Visual Resources

Closure of the landfills would result in direct local long term minor to moderate beneficial impacts to visitor experience, visual resources, and aesthetics. The landfills and previous practices have resulted in a large feral pig population, windblown trash near visitors, and unpleasant debris on the beach.

The recycling, composting, and air transport operations would result in local long term negligible adverse impacts from addition transportation requirements and storage. Additional trucks would be transferring materials between Building 259A and the airport. There would be some additional noise and activity near Building 259A due to the recycling and sorting activities. The construction and operation of a composting facility would result in local long term negligible adverse impacts as a result of the additional traffic going to the composting operations.

Cumulative Impacts to Visitor Experience/ Aesthetic/ Visual Resources

The Preferred Alternative would add long term minor beneficial impacts in the cumulative context to visitor experience, aesthetics, and visual resources. In particular, a well managed solid waste program, along with the other projects, would add to the experience of a well maintained community at Kalaupapa. Visitors and residents would enjoy a clean and aesthetically pleasing built environment.

Conclusion for Visitor Experience/ Aesthetic/ Visual Resources

Preferred Alternative would result in local direct and cumulative long term moderate beneficial impacts to the visitor experience. Closing the existing landfills and cleaning up the area will lead to an improved visitor experience and aesthetically pleasing surroundings. Recycling, composting, and air transport are expected to have a local long term negligible adverse impact to visitor experience and visual resources due to transportation requirements and storage.

IMPACTS OF ALTERNATIVE 2: MULE TRANSPORT

Cultural Resources

The impacts to Cultural Resources from changes to Building 259A and composting at Site E would be the same as described under the Preferred Alternative.

The mule transport option would also result in local direct long term minor adverse impacts to the Pali Trail a resource considered eligible for the National Register of Historic Places. The increased use of mules on the trail would lead to greater rutting of the trail and damage during muddy conditions. This damage is repairable and would not be permanent, rather the park would need to commit to more maintenance to repair the physical damage caused by the increased use of mules carrying greater weight up the trail. Because the corral is an existing facility, changes brought about by Alternative 2 would result in local direct long term negligible adverse impacts to the historic

landscape.

Cumulative Impacts to Cultural Resources

Alternative 2 along with other infrastructure projects at Kalaupapa has the potential for local to regional long term minor adverse cumulative impacts. Improvements are in place or are being considered to the wastewater treatment, the electrical system, and the dock. These improvements are being conducted in compliance with Section 106 of the National Historic Preservation Act. However, the improvements to infrastructure may lead to minor long term adverse impacts if the cumulative effects of the improvements reduce the historic character of Kalaupapa. The historic structure stabilization and restoration undertaken by the NPS has led to local to regional long term moderate beneficial impacts.

Conclusion for Cultural Resources

Alternative 2 would result in local direct and potential cumulative long-term minor adverse impacts to Kalaupapa NHP (listed on the National Register of Historical Places) including:

- Changes to Building 259A would result in local direct long term negligible to minor adverse impacts to the historic landscape.
- Construction of composting facility at Site E would result in direct long-term negligible to minor adverse impacts to the historic landscape.
- The mule transport option would result in local long term minor adverse impacts to the Pali Trail, a resource considered eligible for the National Register of Historic Places.
- Alternative 2 along with other infrastructure projects at Kalaupapa has the potential for local long term minor adverse cumulative impacts.

Under Section 106 of the National Historic Preservation Act, the analysis suggests that the Alternative 2 will have an effect, but not an adverse effect on the Kalaupapa National Historic Landmark. Alternative 2 would not harm the integrity of the resource nor result in impairment to the cultural resources of Kalaupapa.

Socioeconomic and Environmental Justice

Alternative 2 would result in local long term minor beneficial impacts to the resident community. Similar to the Preferred Alternative, the residents would benefit from a clean well maintained community. In addition, removing the waste permanently from the peninsula is a beneficial effect. There is however the potential for the bags to break at the corral or along the trail and create odors or become unsightly. Should this become as issue, measures would be taken to prevent bag breakage including double wrapping the compacted trash.

Cumulative Impacts to Socioeconomic and Environmental Justice

The cumulative impacts of the improvements to infrastructure are expected to be local long term moderate and beneficial. Improved solid waste management, electrical reliability, wastewater management, and an improved dock are considered beneficial impacts to the residents of Kalaupapa. In addition, the on-going historic structure stabilization and restoration is preserving the history of the Settlement.

Conclusion for Socioeconomic and Environmental Justice

Alternative 2 would result in local direct long term minor to moderate beneficial impact to the community of Kalaupapa by providing improved solid waste management service. Composting and mule transport could also result in local direct long term minor adverse impacts due to odor. The cumulative effect of improved infrastructure is local long term and beneficial. Alternative 2 would not harm the integrity of the resource nor result in impairment to the community of Kalaupapa.

Air Quality

Alternative 2 would result in short and long term local negligible adverse impacts to air quality. It is unlikely that odors would be created by sealed bags transported by mules. However, odors could be generated if the bags opened, from the recycling and compacting operation in Building 259A, and, similar to the Preferred Alternative, from the composting operation. The combined effect of these potential sources could result in a local negligible long term adverse impacts.

Cumulative Impacts to Air Quality

The other proposed infrastructure improvement projects would add local short term adverse impacts to air quality, in particular, adding particulate matter from construction. To reduce impacts NPS will implement Best Management Practices to reduce fugitive dust during construction of the wastewater improvements, historic structure work (already in place), and for the electrical system work.

Conclusion for Air Quality

Alternative 2 would result in local long term negligible adverse impact to air quality, including odors from the recycling and compacting operation in Building 259A, from the composting operation, and potentially from compacted trash bags that break. Taken together, with the cumulative impacts, the Alternative 2 would result in a local long term negligible to minor adverse impact to air quality.

Endangered Species/ Wildlife / Vegetation

Alternative 2 would result in no effect to candidate, threatened or endangered species. Building 259A, where recycling would occur and the remaining solid waste would be compacted, is located in an industrial area in the middle of the Settlement that lacks habitat value. Similar to the Preferred Alternative, Alternative 2 includes a composting facility located at Site E. This site was selected, in part, because it was previously disturbed and contains minimal habitat value. Site clearing will impact non-native species found at the site and potentially limited native vegetation found along the margin of the site. The installation of a concrete pad for the composting facility, and the laying of a gravel access road would disturb about three acres of non-native forage grasses and forbs, leading to local short term negligible adverse impacts to non-native wildlife and vegetation. In addition, Alternative 2 would compost food scraps from the dining hall, removing a food source for the feral pig population. This could lead to indirect long term minor to moderate beneficial impacts to vegetation and wildlife if feral pig populations are reduced.

Cumulative Impacts to Endangered Species/ Wildlife / Vegetation

Of the future infrastructure projects at Kalaupapa, the electrical line project has the greatest potential to impact the endangered species, wildlife, and vegetation. Because the line travels through intact

habitats, measures would be employed to reduce impacts. The other infrastructure projects are mainly in the Settlement area and would likely result in negligible impacts to endangered species, wildlife, and vegetation.

Conclusion for Endangered Species/ Wildlife / Vegetation

Alternative 2 would result in no effect to candidate, threatened, or endangered species, and local short term negligible impacts to wildlife and vegetation from construction. Alternative 2 would not harm the integrity of the resource nor result in impairment to the natural resources of Kalaupapa.

Park Operations

Collecting, compacting, and transporting the remaining solid waste to the corral for transport via mule to the Molokai landfill would have a local long term minor to moderate adverse effect on existing park operations. Similar to the Preferred Alternative, park staff would collect the solid waste and sort it in Building 259A. Following sorting the remaining trash would be compacted and transported to the corral. Increased facility management responsibilities would include collecting, sorting, compacting, and transporting solid waste. In addition, the composting operation would require a commitment of staff resources.

Cumulative Impacts to Park Operations

Alternative 2 along with other improvements would result in both beneficial and adverse local long term minor to moderate impacts to park operations. On the adverse side, additional facilities would result in a greater facility management burden to maintain including composting, improved septic systems, and electrical systems. On the other hand, improvements to the dock, electrical system, septic systems, and solid waste handling will greatly reduce the long term burden of fixing these currently failing systems. The improved facilities would require an additional commitment of time and resources to operate, however repair time for currently outdated or overburdened facilities will be reduced.

Conclusion for Park Operations

Alternative 2 will result in local direct long term minor to moderate adverse impact to park operations from increased facility management responsibilities by taking on the management of solid waste. One to three staff persons will likely be needed to accomplish Alternative 2.

Visitor Experience/ Aesthetic/ Visual Resources

Closure of the landfills would result in direct local long term moderate beneficial impacts to visitor experience, visual resources, and aesthetics. The landfills and previous practices have resulted in a large feral pig population, windblown trash near visitors, and unpleasant debris on the beach. The recycling, composting, and mule transport operations would result in local long term negligible adverse impacts to visitors, visual resources, and aesthetics. Additional trucks would be transferring materials between Building 259A and the corral and there would be some additional noise and activity near Building 259A due to the recycling and sorting activities. The construction and operation of a composting facility would result in local long term negligible adverse impacts as a result of the additional traffic and the potential for odors. Impacts at Site E would be negligible because of natural screening. In addition, the loading of compacted trash on the mules may impact the visitor experience if bags break or the process is lengthy and causes visitors to wait around the corral.

Cumulative Impacts to Visitor Experience/ Aesthetic/ Visual Resources

Alternative 2 would add long term minor beneficial impacts in the cumulative context to visitor experience, aesthetics, and visual resources. In particular, a well managed solid waste program, along with the other projects, would add to the experience of a well maintained appearance at Kalaupapa. Visitors and residents would enjoy a clean and aesthetically pleasing built environment.

Conclusion for Visitor Experience/ Aesthetic/ Visual Resources

Alternative 2 could result in local direct long term minor to moderate beneficial impacts to the visitor use and experience, visual resources, and aesthetics. Closing the existing landfills and cleaning up the area is a beneficial impact. Composting, recycling, and mule transport are expected to have long term local negligible adverse impact to visitor experience due to the potential for odors, visual impacts from composting, and aesthetic impacts from handling compacted trash at the mule corral.

IMPACTS OF ALTERNATIVE 3: NO ACTION

Cultural Resources

Alternative 3 would result in local direct long term negligible to moderate adverse impacts depending upon the fate of the existing landfill. If the landfill continues to operate there would be local direct negligible impacts to cultural resources. If no solid waste service was provided garbage accumulation or dumping could lead to local direct long term moderate adverse impacts to cultural resources. Garbage piles would disrupt the character of the historic landmark and mar the landscape. In addition, ad hoc trenches or other facilities could disrupt archeological resources and historic landscapes.

Cumulative Impacts to Cultural Resources

Alternative 3 along with other infrastructure projects at Kalaupapa has the potential for local, long term minor to moderate adverse cumulative impacts. Improvements are in place or are being considered to the wastewater treatment, the electrical system, and the dock. These improvements are being conducted in compliance with Section 106 of the National Historic Preservation Act. However, the improvements to infrastructure along with uncontrolled garbage disposal may lead to minor to moderate long term adverse impacts if the cumulative effects of the improvements reduce the historic character of Kalaupapa. Separately, the historic structure stabilization and restoration undertaken by the NPS has led to local to regional long term moderate beneficial impacts.

Conclusion for Cultural Resources

Alternative 3 would result in potential local direct long term negligible to moderate adverse impacts to Kalaupapa National Historical Park (listed on the National Register of Historical Places). The intensity of the impacts would depend upon the fate of the existing landfill. The cumulative impacts could add to the intensity. Under Section 106 of the National Historic Preservation Act, the analysis suggests that the Alternative 3 will have an effect, but not an adverse effect on the Kalaupapa National Historic Landmark. Alternative 3 would not harm the

integrity of the resource nor result in impairment to the cultural resources of Kalaupapa.

Socioeconomic and Environmental Justice

Alternative 3 could result in local direct long term negligible to major adverse impacts to the community depending upon the fate of the landfills. If the landfills close and garbage is allowed to accumulate or is disposed of improperly, the result impacts would be moderate to major and adverse. However, it is likely that the landfills would remain open while the patient community remains on the peninsula resulting in a continuation of the negligible adverse impacts from wind blown trash and odors.

Cumulative Impacts to Socioeconomic and Environmental Justice

The cumulative impacts of the improvements to infrastructure are expected to be local long term moderate and beneficial. Improved electrical reliability, wastewater management, and an improved dock are considered beneficial impacts to the residents of Kalaupapa. In addition, the on-going historic structure stabilization and restoration is preserving the history of the Settlement.

Conclusion for Socioeconomic and Environmental Justice

Alternative 3 could result in local direct long term negligible to major adverse impacts to the community depending upon the fate of the landfills. The cumulative effect of improved infrastructure is local long term and beneficial. Alternative 3 would not harm the integrity of the resource nor result in impairment to the community of Kalaupapa.

Air Quality

Alternative 3 would result in long term local minor to moderate adverse impacts to air quality. Small amounts of wind-blown dust, odors, Volatile Organic Compounds, and methane from the existing DOH landfill operation would continue to have a minor, localized, and long-term adverse effect on Kalaupapa's air quality. In the future, as lifts are added to the existing above ground household waste landfill increasing its height, the ability of the nearby trees to prevent the spread of wind-blown dust would be diminished. In addition, the DOH practice of burning some solid waste intensifies the local air quality impacts to a moderate level.

Cumulative Impacts to Air Quality

The other proposed infrastructure improvement projects would add local short term adverse impacts to air quality, in particular, adding particulate matter from construction. To reduce impacts NPS will implement Best Management Practices to reduce fugitive dust during construction of the wastewater improvements, historic structure work (already in place), and for the electrical system work.

Conclusion for Air Quality

Continuation of current practices would result in a local direct long term minor to moderate adverse impact to air quality due to emissions from the landfill, current burning of waste, and dust.

Endangered Species/ Wildlife / Vegetation

Depending upon the fate of the landfill, Alternative 3 could result in minor to moderate impacts to endangered species, wildlife, or vegetation. If garbage was allowed to pile up and migrated out of

the Settlement area there is the potential windblown trash could enter adjacent environments such as the ocean or uplands and result in resource damage. This scenario is unlikely because the landfill would probably continue operations leading to no effects to candidate, threatened, or endangered species. Separately, Alternative 3 would result in the continued indirect long term minor to moderate adverse impacts to vegetation and wildlife from feral pigs. The current practice of feeding the feral pigs is likely resulting in an increased numbers and corresponding indirect impacts to wildlife and vegetation.

Cumulative Impacts to Endangered Species/ Wildlife / Vegetation

Of the future infrastructure projects at Kalaupapa, the electrical line project has the greatest potential to impact the endangered species, wildlife, and vegetation. Because the line travels through intact habitats measures would needed to be employed to reduce impacts. However, in the cumulative context, Alternative 3 would not lead to additive impacts. The other infrastructure projects are mainly in the Settlement area and would likely result in negligible impacts to endangered species, wildlife, and vegetation.

Conclusion for Endangered Species/ Wildlife / Vegetation

Alternative 3 would likely result in no effects to candidate, threatened, or endangered species. Depending upon the fate of the landfill, windblown trash could lead to minor to moderate impacts to adjacent environments. Separately, the on-going indirect long term minor to moderate adverse impacts to wildlife and vegetation from feral pigs would continue. Alternative 3 would not harm the integrity of the resource nor result in impairment to the natural resources of Kalaupapa.

Park Operations

Alternative 3 could result in local direct long term negligible to moderate adverse impacts to park operations depending upon the fate of the landfills. If the landfills close and garbage is allowed to accumulate or is disposed of improperly, the result impacts would be moderate and adverse. However, it is likely that the landfills would remain open while the patient community remains on the peninsula resulting in a continuation of the negligible adverse impacts from wind blown trash.

Cumulative Impacts to Park Operations

Alternative 3 along with other improvements would result in both beneficial and adverse local long term negligible to moderate impacts to park operations. On the adverse side, additional facilities would result in a greater facility management burden to maintain including improved septic systems and electrical systems. On the other hand, improvements to the dock, electrical system, septic systems, will greatly reduce the long term burden of fixing these currently failing systems.

Conclusion for Park Operations

Alternative 3 will result in local direct long term negligible to moderate adverse impact to park operations depending upon the long term fate of the landfill.

Visitor Experience/ Aesthetic/ Visual Resources

Alternative 3 would result in local direct long term moderate adverse impacts to the visitor experience from continued operation of the landfills adjacent to the Pali Trail. The landfills and previous practices have resulted in a large feral pig population, windblown trash near visitors, and

unpleasant debris on the beach. The existing landfill operation with its open aboveground lifts, open trenches, game waste disposal pit and the presence of feral pigs would continue to adversely affect visitor enjoyment. Those visitors riding or hiking down the Pali Trail would continue to be subjected to the odors and wind-blown trash coming from the nearby landfill operation. As additional lifts are constructed for the household waste landfill, the effectiveness of the existing trees in collecting wind-blown trash would be reduced thereby increasing the adverse effect on visitor enjoyment. The dead animals and offal being disposed into the game waste pit would remain as an attraction to vectors, including the feral pigs that move between the pit and the pig slop feeding barrel. Although unlikely, if the landfills closed and no services were provided, windblown and accumulated trash would lead to a moderate to major adverse impact on visitor experience, aesthetics, and visual resources at Kalaupapa NHP.

Cumulative Impacts to Visitor Experience/ Aesthetic/ Visual Resources

The cumulative projects considered in the analysis would add long term minor to moderate beneficial impacts to visitor experience, aesthetics, and visual resources. In particular, the other projects would add to the experience of a well maintained community at Kalaupapa.

Conclusion for Visitor Experience/ Aesthetic/ Visual Resources

Alternative 3 would result in local direct long term moderate adverse impacts to the visitor experience from continued operation of the landfills adjacent to the Pali Trail. In addition, although unlikely, closure of the landfills without other service would lead to moderate to major adverse impacts due to accumulated and windblown trash.

CHAPTER 6: CONSULTATION AND COORDINATION

Community meetings were held in 2004 and in 2006 to discuss the project with community. Notice of the meetings was posted in the community and discussed within the community. At the 2004 meeting, a presentation was provided on the range of alternatives and options that had been identified for off-site and on-site disposal. About 25 individuals attended the meeting and commented on the on-site locations and disposal methods that were presented by the NPS. Most of the attendees were patients and the rest were either DOH workers or NPS staff. The issues discussed included alternatives, visual impacts, and schedule. NPS indicated that copies of the environmental assessment containing an environmentally preferred alternative would be made available to the community for review.

On July 12, 2006, a second scoping meeting was held with the community to discuss the more fully developed alternatives. The meeting was advertised around the community through posting and word of mouth and was well attended with 36 patients, DOH staff, and NPS staff attending. NPS presented designs for recycling and composting and discussed the alternatives for the remaining waste. The NPS had the composting and recycling consultants on hand to describe the design and operation of the recycling and composting facility. The community asked questions about the potential for odor and dust, noise, and visual impacts from the project. There were also questions about the closure of the existing landfills and education for the community about recycling. NPS staff responded to questions and left with a sense the community supported the Preferred Alternative.

In addition to the meetings, scoping letters were mailed in July 2005 and June 2006 to interested individuals, organizations, and agencies informing them of the Environmental Assessment. In 2005, three comment letters were received from agencies including: the State of Hawai`i Department of Hawaiian Homelands, the State of Hawai`i Office of Hawaiian Affairs, and the County of Maui Department of Planning. The two state agencies requested a copy of the EA and the Office of Hawaiian Affairs asked that the NPS coordinate with a few local groups. The Maui Department of Planning asked that the NPS discuss facility management responsibilities between the NPS and the State, clarify the scope of the EA, and identify the agency with decision-making authority for the project. In 2006, NPS received six additional letters in response to additional scoping efforts described in the next paragraph. The letters were from two individuals, an adjacent landowner, a foundation, the State of Hawai`i Department of Hawaiian Homelands, and the Advisory Council for Historic Preservation (ACHP). The letter from the adjacent landowner described the need for greater coordination of access should the NPS pursue Alternative 2. In relation to locating the composting facility, the NPS received a letter from State of Hawai`i Department of Hawaiian Homelands Hawaii Homelands dated September 6, 2006 approving the proposed use of Site E as the composting facility. ACHP raised questions about the use of Site A, which has subsequently been removed, and asked for copies of other correspondence which will be provided.

Section 106 Summary

As part of the Solid Waste Management planning process, compliance with Section 106 of the National Historic Preservation Act (NHPA) (Section 106) is required. The NPS initiated communication with a portion of Section 106 stakeholders, mainly the Kalaupapa patient residents, in 2004 when preliminary alternatives were developed and presented. Additional communication was made with over 40 Section 106 stakeholders during the NEPA scoping period by way of a formal one page scoping notice dated July 26, 2005 that informed interested parties of the preparation of an Environmental Assessment (EA) to evaluate the proposed changes to solid waste management at Kalaupapa National Historical Park. Organizations, individuals,

and government agencies, including those associated with Section 106 compliance, were invited to provide written feedback to the alternatives presented in that NEPA scoping notification.

Formal Section 106 consultation with 42 Section 106 stakeholders, including Native Hawaiian Organizations such as Office of Hawaiian Affairs and Department of Hawaiian Homelands, was initiated in writing on June 23, 2006. All stakeholders received a copy of an 18-page draft of the EA's "Chapter 3: Alternatives", which presented NPS revisions made to the Solid Waste Management Plan's alternatives on May 12, 2006. Formal Section 106 consultation with the State Historic Preservation Office (SHPO) and Advisory Council on Historic Preservation (ACHP) was initiated in writing on July 24, 2006. Correspondence with these two parties additionally outlined prior efforts regarding consultation with Section 106 stakeholders, and in accordance with CFR Part 800 Section 800.0(c) (Use of the NEPA process for Section 106 purposes), provided advanced notification of the intent to use the NEPA process for all subsequent Section 106 consultation on this EA.

Following from the NEPA scoping period initiated on July 26, 2005, the NPS held a Section 106/NEPA consultation meeting on July 12, 2006 with the Kalaupapa community at McVeigh Social Hall (Kalaupapa) in order to: 1.) present revised alternatives developed on May 12, 2006; and 2.) better understand the park's cultural resources and the potential impacts of the proposed actions on those resources. The NPS publicized this consultation meeting by posting invitational flyers at 7 locations throughout the Kalaupapa Settlement (NPS Headquarters, Hospital/Care Home, Fuesaina's Bar, Post Office, General Store, DOH Administrative Office, and DOH Cafeteria). A three page "Kalaupapa Community Solid Waste Operation: Question and Answer Fact Sheet" posted at the same 7 locations provided notification of the July 12, 2006 community consultation meeting as well. The June 23, 2006 Section 106 initiation letters mailed to Kalaupapa community-based Section 106 stakeholders also included an invitation to attend the July 12th meeting at the Kalaupapa McVeigh Social Hall.

Oral comments and questions on cultural resource-related issues received from a portion of the 36 meeting attendees as well as 5 written responses received during the formal Section 106 30-day comment period generally fell into the following categories:

- "Issue" comments and questions regarding potential adverse impacts on visual resources, adverse noise impacts, adverse cultural impacts, adverse impacts on general park resources, and adverse cumulative effects.
- "Process" comments and questions regarding ideas about alternatives and mitigation measures.
- General comments and questions expressing concern about current and proposed solid waste management practices as it applies to the individual resident as well as the community at large.

All comments outlined below in Table 6 are based on Section 106 consultations conducted in preparation of this document, and are specific to cultural resource and cultural landscape issues. Section 106 consultations will be ongoing with the distribution of this document to the public until a NEPA Finding of No Significant Impact (FONSI) or Record of Decision (ROD) has been established.

Table 6: Issues Raised During Section 106 Consultations June-August 2006

Actions Common to Both the Action Alternatives
Comment: While not a historic building, the structure (Building 259A) is located in the industrial

area of the National Historic Landmark and needs to be designed to be of an appropriate height, scale, materials and architecture to be compatible with its context.
Comment: Hawaiian proverb: "*Mai kaulai ia na iwi o kou kupuna*" (translation: Do not dry out the bones of your Kupuna [ancestors]). Human wastes were considered to be vile, derogatory and negative. The Kahuna of old were known to use human waste of a person to exact evil on the same person or family. An interpretation of this Hawaiian proverb saying is: "Where a person's properties are, that's where they belong". While there is a profound value concept between human bones and waste, they are both necessary issues of the human body. It is recommended that a process of recycling of solid waste keeps [these waste products] on Molokai and its surrounding waters. It is suggested: 1.) Construct and operate landfill, 2.) Install and operate incinerator, and 3.) Transport solid waste by mule for off-site disposal on Moloka`i.
Comment: Shred the cardboard waste, soak it with some wetting/binding agent and use it as mulch around the tree bases and/or along the unpaved roadsides as a means to 1.) retain moisture at tree bases, and 2.) minimize maintenance at tree bases or roadsides.
Comment: Belief that maintaining a stable population of the feral pigs that frequent the [current] dump area by retaining a minimum amount of food waste for regular feeding would lend itself to the lore and ambience to the community, which should be woven into the story of Kalaupapa in the coming years rather than being terminated.
Comment: Need clarification on how the potential cumulative effects to historic properties are being addressed from NPS' stated need for additional [annual] storage for construction and demolition debris and hazardous waste?
Comment: Concern regarding noise issues was expressed regarding the recycling center/trash sorting being located near (upwind) of residences and within ear-shot of the park's new reference center (Hale Malama) where people will be coming to do research and visit the museum collections.
Preferred Alternative: Off-Site Disposal by Aircraft w/ Composting Facility at Site E (Preferred)
Overall: No specific objections have been raised regarding the Preferred Alternative with composting facility located at Site E.
Comment: Site E is a better location than Site A because this area is already being used for solid waste management with the existing landfill; the generation of compost at this location could help with the efforts to cover up the landfill areas once those operations are closed down.
Comment: Need additional information regarding the potential adverse effects to historic properties and how measures to avoid, minimize, or mitigate potential adverse effects have been considered.
Comment: Need clarification on why the Department of Hawaiian Homelands is opposing the continued use of landfill operations at Site E
Comment: Need clarification on how the previous disturbance at Site E would minimize potential adverse effects to the cultural landscape as the result of constructing a composting facility?
Comment: Concern was raised regarding the proper clean-up of the landfill areas once landfill operations are shut down.
Preferred Alternative: Off-Site Disposal by Aircraft w/ Composting Facility at Site A (Alternate)
Overall: Specific concerns were raised regarding the Preferred Alternative with composting facility at Site A due to adverse visual impacts, and/or impacts on the cultural landscape/view shed.
Comment: To avoid visual impacts at Site A, relocate the site to the west of proposed Site A, and re-use the old overgrown section of Damien Road as the access route.
Comment: Site A serves as a disaster/evacuation refuge area location near Kauhakō Crater.

Comment: Need additional information regarding the potential adverse effects to historic properties and how measures to avoid, minimize, or mitigate potential adverse effects have been considered.
Comment: Need additional discussion on cumulative, direct and indirect impacts that may result from the [future] potential construction of a paved road and electrical wiring to Site A.
Alternative 2: Transport by Mule to Topside Moloka`i
Comment: Several concerns about crossing private property and where the short-term storage area would be located as currently the mule ride originates 'topside' on property owned by R.W. Myer, Ltd.
Alternative 3: No Action Alternative
None
General:
Comment: With the proposed programs, Kalaupapa would be ahead of Honolulu, and Honolulu would no longer be able to say that Kalaupapa is still in Father Damien's time.

As Kalaupapa is listed on the National Register as the Kalaupapa National Historic Landmark, Section 110 of the Historic Preservation Act also applies. Section 110 states:

> Prior to the approval of any Federal undertaking which may directly and adversely affect any National Historic Landmark, the head of the responsible Federal agency shall, to the maximum extent possible, undertake such planning and actions as may be necessary to minimize harm to such landmark, and shall afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on the undertaking.

National historic landmark designation places a higher standard than that which applies to properties that are listed in or eligible for listing in the National Register of Historic Places.

The Advisory Council on Historic Preservation, the Hawai'i state historic preservation officer, and concerned groups were contacted at the beginning of this environmental assessment process (see Consultation and Coordination). The NPS conducted the Section 106 and is forwarding a copy of this environmental assessment to the State Historic Preservation Officer and the Advisory Council for Historic Preservation.

Section 7 Endangered Species Act

In addition to cultural resources, Section 7 of the Endangered Species Act, as amended, requires consultation with the U.S. Fish and Wildlife Service or the National Marine Fisheries Service to ensure that proposed actions do not jeopardize the continued existence of any listed or candidate species or critical habitat. Section 7 consultation has been initiated by a copy of this EA being sent to the U.S. Fish and Wildlife Service in Honolulu with a request for their review and comments.

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REFERENCES

A-Mehr, Inc. November 2003. *Closure and Post-Closure Plan for Kalaupapa Municipal Solid Waste Landfill, Kalaupapa National Historical Park, Moloka`i, Hawai`i*. Prepared for State of Hawai`i Department of Health, Hansen's Disease Branch, Honolulu, Hawai`i

Environmental Protection Agency 2005. Air Trends. http://www.epa.gov/airtrends/nitrogen.html and- http://www.epa.nsw.gov.au/waste/envguidlns/composting2.htm

Friesen, Gerald February 2003. *Landfill Siting Analysis for Kalaupapa National Historical Park, Moloka`i, Hawai`i*. Friesen Associates. Prepared for the National Park Service

Fisher P W, Wang H and Wilber C 1986, *Odour Control and Abatement for a Sludge Composting Facility*. Proceedings of the 79th Annual Meeting of the Air Pollution Control Association, Minneapolis, Minnesota. Paper 86-62.6.

Franklin Associates June 1998. *Characterization of Building-Related Construction and Demolition Debris in the United States*. Prepared for the U.S. Environmental Protection Agency, Municipal and Industrial Solid Waste Division, Office of Solid Waste. Prairie View, Kansas

Goldstein N 2002, Getting to Know the Odour Compounds, *Biocycle*, July, pp 42-44.

Goodwin, Conrad "Mac", Conrad Erkelens and Carla Favreau March 1994. *A Kalaupapa Sweet Potato Farm: Report on Archaeological Data Recovery Operations, Kalaupapa Airport Project, Kalaupapa, Moloka`i, Hawai`i*. Volume I and II. International Archaeological Research Institute, Honolulu, Hawai`i

Green, Linda W. September 1985. *Exile in Paradise: The Isolation of Hawai`i's Leprosy Victims and Development of Kalauapapa Settlement, 1865 to the Present*. Historic Resource Study. National Park Service, Denver Service Center, Denver, Colorado

Imamura, Carolyn K. October 1990. *A Strategic Plan for Transition at Kalaupapa Settlement*. Pacific Basin Development Council, Honolulu. Prepared for the Communicable Disease Division, Department of Health, State of Hawai`i

Kahl, David A. April 2003. *Evaluation of Solid Waste Disposal Options*. D.A. Kahl Consulting. Fort Collins, Colorado. Prepared for the National Park Service

Kahl, David A. September 16, 2004. *Evaluation of Solid Waste Disposal Options. Addendum 1*. D.A. Kahl Consulting. Fort Collins, Colorado. Prepared for the National Park Service

Kahl, David A. March 2002. *Trip Report, Integrated Solid Waste Alternatives Plan*. D.A. Kahl Consulting. Fort Collins, Colorado. Prepared for the National Park Service

Lyum, Matt CLP January 2006. *Evaluation Report of Four Composting Options for Kalaupapa National Historical Park.* Prepared for the National Park Service

Mark D. McCoy James L. Flexner John M. Matsunaga, August 2005: An Archaeological Survey of Two Proposed Solid Waste Plant Sites, Kalaupapa National Historical Park, Hawai`i

McNamara, Katherine A. and Delyn Kies April 2000. *Final Report, Integrated Solid Waste Management Plan, Kalaupapa National Historic Park, Moloka`i, Hawai`i*. Harding Lawson Associates, Novato, California. Prepared for the National Park Service

MK Engineers, LTD. July 2005: Project Scoping Report, Rehabilitate unsafe and Failing Primary Electrical distribution System, Kalaupapa NHP

Miller F C 1993, Minimizing odor generation. In Hoitink H A J and Keener H M (eds) *Science and Engineering of Composting: Design, Environmental, Microbiological and Utilization*

Aspects, Renaissance Publications, Worthington, United States of America, pp 219-41 (also contains other relevant articles).

National Park Service December 1980. *General Management Plan, Kalaupapa National Historical Park, Island of Moloka`i, Hawai`i*. Western Region, San Francisco, California

National Park Service October 1986. *Land Protection Plan, Kalaupapa National Historical Park.* Pacific Area Office, Honolulu, Hawai`i

National Park Service March 1991. *Integrated Solid Waste Alternative Program, Manager's Guide*. Engineering and Safety Services Division, Washington, D.C.

National Park Service 1997. *Statement for Management, Kalaupapa National Historical Park.* Kalaupapa National Historical Park, Moloka`i, Hawai`i

National Park Service May 27, 2004. *Kalaupapa National Historical Park Incinerator Siting Analysis*. Pacific West Region, Facility Management Branch, Seattle, Washington

National Park Service 2005 *Draft Cultural Landscape Inventory: Kalaupapa and Kalawao Settlements, Kalaupapa National Historical Park*, Pacific West Region, Seattle, Washington

Somers, Gary F. 1985. *Kalaupapa, More Than a Leprosy Settlement. Archeology at Kalaupapa National Historical Park*. Publications in Anthropology No. 30. National Park Service, Western Archeological and Conservation Center, Tucson, Arizona

Soros, Ronald L. January 2001. *Contaminated Site Investigation, Kalaupapa National Historic Park, Island of Moloka`i, Hawai`i*. Harding Lawson Associates, Aiea, Hawai`i. Prepared for the National Park Service

Tolvanen O K, Haenninen K I, Veijanen A and Villberg K 1998: Occupational hygiene in biowaste composting, *Waste Management and Research*, 16(6), pp 525-540.

GLOSSARY

The following alphabetically listed terms are excerpted from the *Decision Maker's Guide to Solid Waste Management*, Volume II, (EPA 530-R-95-023), 1995.

aerated static pile: Forced aeration method of composting in which a freestanding composting pile is aerated by a blower moving air through perforated pipes located beneath the pile.

Baler: A machine used to compress recyclables into bundles to reduce volume. Balers are often used on newspaper, plastics, and corrugated cardboard.

Baling: The compaction of solid waste (shredded or non-shredded) or plastic and metal recyclables (flattened or non-flattened) into small rectangular blocks or bales. Baled solid waste is placed in a landfill in a similar fashion as a cell, with cover surrounding a bale or group of bales. Baling recyclable materials makes them easier to handle and transport.

Composting: The controlled biological decomposition of organic solid materials under aerobic conditions.

Construction and demolition debris (**C&D**): Waste material that is produced in the process of construction, renovation, or demolition of structures. Structures include buildings of all types (both residential and nonresidential) as well as roads and bridges. Components of C&D debris typically include concrete, asphalt, wood, metals, gypsum wallboard, and roofing. Land clearing debris, such as stumps, rocks, and dirt, are also included in some state definitions of C&D. (Definition from *Characterization of Building-Related Construction and Demolition Debris in the United States*, Prepared for EPA by Franklin Associates, Prairie Village, Kansas).

Construction and demolition debris defined by the State of Hawai`i: "Construction and demolition waste" means solid waste, largely inert waste, resulting from the demolition or razing of buildings, of roads, or other structures, such as concrete, rock, brick, bituminous concrete, wood, and masonry, composition roofing and roofing paper, steel, plaster, and minor amounts of other metals, such as copper. Construction and demolition waste does not include cleanup materials contaminated with hazardous substances, friable asbestos, waste paints, solvents, sealers, adhesives, or similar materials.

flood plain: A region of land around a body of water, usually a river or stream, that is flooded on a regular basis, usually annually.

hazardous waste: Waste material that exhibits a characteristic of hazardous waste as defined in RCRA (ignitability, corrosivity, reactivity, or toxicity), is listed specifically in RCRA 261.3 Subpart D, is a mixture of either, or is designated locally or by the state as hazardous or undesirable for handling as part of the municipal solid waste and would have to be treated as regulated hazardous waste if not from a household.

Incinerator: A facility within which solid waste is combusted.

integrated solid waste management: A practice using several alternative waste management techniques to manage and dispose of specific components of the municipal solid waste stream. Waste management alternatives include source reduction, recycling, composting, energy recovery, and landfill.

in-vessel composting: A method in which compost is continuously and mechanically mixed and aerated in a large, contained area.

Leachate: Liquid that has percolated through solid waste or another medium and has extracted,

dissolved, or suspended materials from it. Because leachate may include potentially harmful materials, leachate collection and treatment are crucial at municipal waste landfills.

leachate collection system: A network of pipes or geotextiles/geonets placed at low areas of the landfill liner to collect leachate from a landfill for storage and treatment. Flow of leachate along the liner is facilitated by the use of a soil drainage blanket or geonet.

municipal solid waste (MSW): MSW means household waste, commercial solid waste, non-hazardous sludge, conditionally exempt small quantity hazardous waste, and industrial solid waste.

Recycling: The process by which materials otherwise destined for disposal are collected, reprocessed, or remanufactured, and are reused.

solid waste: Any garbage, or refuse, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved materials in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges that are point sources subject to permit under 33 U.S.C. 1342, or source, special nuclear, or by-product materials as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923). (Definition from 40CFR 258.2.)

Wetlands: An area that is regularly wet or flooded and has a water table that stands at or above the land surface for at least part of the year. Coastal wetlands extend back from estuaries and include salt marshes, tidal basins, marshes, and mangrove swamps. Inland freshwater wetlands consist of swamps, marshes, and bogs. Federal regulations apply to landfills sited near or at wetlands.

white goods: Large household appliances such as refrigerators, stoves, air conditioners, and washing machines.

Windrow: A large, elongated pile of composting material, which has a large exposed surface area to encourage passive aeration and drying.

APPENDIX A: RESOURCE PROTECTION MEASURES

Under the Preferred Alternative, best management practices and mitigation measures would be used to prevent or minimize potential adverse effects associated with the project. These practices and measures would be incorporated into the project construction documents and plans. Resource protection measures undertaken during project implementation would include, but would not be limited to, those listed in below. The impact analyses in the "Affected Environment and Environmental Consequences" section were performed assuming that these best management practices and mitigation measures would be implemented.

Resource Topic	Mitigation	Responsibility
Cultural Resources	1. A meeting would be held with the Chief of Cultural Resources to discuss the area's historic, cultural landscape, and archeological resources, clarify construction schedules, and provide instructions regarding notification of the appropriate personnel if human remains or other artifacts are discovered. 2. If prehistoric or historic archeological resources are discovered during any portion of the proposed action, work in the area associated with the find would cease until evaluated by the park archeologist or designated representative, and procedures outlined in 36 CFR 800 would be followed, potentially including relocation of the work to a non-sensitive area to avoid further disturbance to the site until the significance of the find can be evaluated. 3. Discovered resources would be evaluated for their potential National Register of Historic Places significance, and, if needed, mitigation measures would be developed in consultation with the Hawai`i State Historic Preservation Officer, such as changes in project design and/or archeological monitoring of the project and data recovery conducted by an archeologist meeting the Secretary of the Interior's standards.	**NPS Project Manager and NPS Cultural Resources staff**
Socioeconomic / Environmental Justice	1. The community will be kept informed of the progress of the project throughout the design and construction phase, including posting on the community bulletin board and through regular meetings.	**NPS Project Manager and NPS Superintendent**

Resource Topic	Mitigation	Responsibility
Air Quality	1. Dust control measures would be employed by the contractor to minimize the impacts to air quality associated with ground disturbance and construction activities. Reasonable measures will be taken to reduce air pollution, including but not limited to wetting down roads and dry materials to prevent blowing dust, utilizing or removing materials as soon as possible, and keeping the project neat, orderly, and in a safe condition.	**NPS Project Manager, NPS Superintendent, and NPS Facility Management Division**
Park Operations	1. The NPS will seek additional staffing to adequately operate the solid waste management system.	**NPS Superintendent**
Visitor Experience/ Aesthetic/ Visual Resources	1. Kalaupapa NHP will not be closed during construction. 2. Visitor safety would be ensured day and night by fencing of the construction limits. 3. For Alternative 2, the mule concessionaire will be required, as part of the hauling contract, to pick up trash that may be released by the hauling operation.	**NPS Project Manager and NPS Superintendent**

APPENDIX B TOPICS DISMISSED FROM FURTHER REVIEW

Resource Topic /Consultation Requirement	Reason Dismissed
Floodplains and Wetlands/ **EO 11988 (Amended by EO 12148) Floodplain Management, May 1977** **EO 11990, Protection of Wetlands, May 1977**	**Floodplains** Executive Order 11988, Floodplain Management, and the guidelines for implementing the Executive Order developed by the Water Resources Council published in the *Federal Register* in 1978, direct environmental analysis for proposed actions and alternatives located in floodplains to identify potential impacts associated with occupation and modification of floodplains. The FEMA Flood Insurance Map covering the Makalanua (Kalaupapa) peninsula shows only a very short segment of the coastline falling within the 100-year floodplain. Site E is not identified within a floodplain on the FEMA maps. **Wetlands** Executive Order 1990, Protection of Wetlands, directs federal agencies to avoid to the extent possible adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever possible. The U.S. Fish and Wildlife Service's National Wetlands Inventory Map covering Kalaupapa shows no wetlands in the general vicinity of Site E and categorizes the peninsula as upland habitat. None of the alternatives include work within a wetland area.
Water Quality/ **Clean Water Act (33 U.S.C. §1251-1376 et seq.); Oil Pollution Control Act of 1990 (33 U.S.C. §2701 et seq.)**	Measures would be taken to protect water quality including: 1. Construction of the composting facility would disturb about three acres of land and has the potential for short term negligible adverse impacts to water quality from construction site runoff. In order to prevent construction site runoff the NPS would include measures in the construction contract, including: • Store topsoil surrounded by silt fencing or other appropriate tool to prevent sediment laden runoff from entering waterways • Topsoil will be overtopped by semi-permeable matting, anchored together to prevent siltation • Maintain adequate erosion control or drainage structures 2. For the composting operation, measures to prevent runoff from the composting operation would include either covering the compost piles or collecting storm water runoff and using it in the compost process.

Resource Topic /Consultation Requirement	Reason Dismissed
Soundscape / Noise **Noise Pollution and Abatement Act (42 U.S.C. §7641)**	The Preferred Alternative and Alternative 2 would result in a local direct short term negligible to minor adverse impacts during construction activities. In addition, local long term direct negligible adverse impacts would result from the operation of a composting facility at Site E and operation of the recycling center in Building 259A. To reduce potential impacts construction activities would occur during daytime hours. If NPS receives complaints about the noise from Building 259A, measures would be taken including scheduling noisy activities when residents are away or building noise attenuation devices.
Lightscape	Facilities at Site E and the recycling center will require minimal lighting for safety. New lighting will be directed downward to reduce errant light and be triggered by motion sensor to avoid prolonged illumination. The impact of lighting will be a local long term negligible adverse impact to the night sky.
Prime or Unique Farmlands **Farmland Protection Policy Act (7 U.S.C. §4201 et seq.)**	Kalaupapa NHP is not included in the definition of prime or unique farmlands. No impacts are anticipated.
Geology, Topography, Soils **Geohazards and Tsunamis**	The construction of a composting facility would result local long term negligible adverse impacts to geology, topography, and soils. Site E is previously disturbed and relatively flat. Site work would include clearing and grubbing and minor grading of about three acres to lay the concrete pad for the composting facility. The soil material in and around Site E consists of alluvium and colluvium that has accumulated at the base of the cliff at depths ranging from two to five feet. There are no known faults in the vicinity of Site E. According to the Federal Emergency Management Agency's flood insurance maps, Site E is located outside the tsunami inundation zone.
Transportation and Circulation	With the limited number of vehicles and people, traffic and circulation is not an issue at Kalaupapa.
Land Use	Land at Kalaupapa is used for historic preservation, residential, recreational, and tourism purposes. Kalaupapa preserves a number of cultural and historic sites as well as natural resource areas. Resource management actions within Kalaupapa are guided by the *Resource Management Plan, Kalaupapa National Historical Park, Kalaupapa, Hawai`i* (NPS 2000c) and the objectives for that plan were developed based on the Park's 1987 Statement of Management. The objectives recognize the resident patients as the most important park resources and aim to preserve the patient's current lifestyle and community for as long as they wish to be at Kalaupapa. Other park objectives include preserving the historic sites of Kalawao and Kalaupapa, participating in preserving the sites and structural remains of the early

Resource Topic /Consultation Requirement	Reason Dismissed
	Hawaiian period, protecting the parks native ecosystems from invasive species, providing care for the park's significant collections, completing archeological surveys and maps for the park and conducting natural history research. The alternatives in this EA are consistent with the previous planning for Kalaupapa NHP including the Statement of Management.